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AN EXPERIMENTAL STUDY OF TWO LANGUAGE MODELLING PROCEDURES  
WITH MODERATELY MENTALLY RETARDED CHILDREN

by



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A THESIS

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## ABSTRACT

This study was designed to investigate the value of two language modelling procedures in enhancing the level of linguistic maturity in moderately to severely mentally retarded children. Thirty institutionalized, retarded children between the ages of eight and sixteen years engaged in a language training project for a period of ten weeks. The selected subjects were all capable of producing language at least at the level of two-word utterances, but were not yet mature users of the language. Their language performance was comparable to that of normal children from two to five years of age. The subjects were randomly assigned to three treatment groups: an expansion modelling group, an expatiation modelling group, and a control group in which there was no consistent modelling. The subjects met in pairs, five times each week, with a language trainer for half-hour language training sessions. The training sessions used a variety of manipulative and dramatic play activities to encourage verbal communication and thus provide opportunities for language modelling in a meaningful context. The language trainers, all institution staff members, were assigned to the treatment groups daily on a random basis. Language maturity was assessed before the training project began, and again at its conclusion, using two tests and several measures derived from language samples.

The study asked the questions, "Does consistent language modelling lead to more mature language competence and performance?" and, if so, "Which of two modelling procedures, expansion or expatiation, is more beneficial?" An analysis of increases in group mean scores from pre-testing to post-testing suggests a possible trend in favor of expansion modelling, but statistical significance was not achieved. A two-way



analysis of variance did yield significant results in favor of the expansion modelling group on one measure, the number of complete sentences used. This would indicate that expansion modelling encourages the increased use of complete sentences in free conversation. This finding is of particular interest. In a language system in which the complete subject-verb-object sentence is seen as the "mature" utterance and considerably more advanced than mere naming and one-word mands, a training procedure which leads to significantly greater production of complete sentences is of value.

The study also looked for differences between children with Down's Syndrome and those of other etiologies with respect to language maturity following treatment. It failed to detect any significant differences. Apparently Down's Syndrome children grew in language maturity to no greater or lesser extent than did the other retarded subjects, regardless of treatment group.

The study also yielded some interesting findings about the feasibility of teaching language modelling techniques to interested adults with little or no previous training in language development. It demonstrated that it is quite possible for adults to learn to respond to children's attempts at verbal communication in at least three distinct ways, and to vary their mode of response at will.

Recommendations were also made for further research into the usefulness of language modelling procedures with mentally retarded subjects. Recommendations included increased duration of the training project, increased control over the amount of trainer - subject interaction (and hence over the amount of modelling received by the subject), greater homogeneity of initial language usage among subjects,



and increased numbers of subjects. In addition, the use of other modelling procedures involving various combinations of both expansion and exaptation techniques could be tested.



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# CHAPTER I

## INTRODUCTION TO THE STUDY

### A. Background

In recent years there has been a major move toward "deinstitutionalization" of the mentally retarded population in North America, and toward integration of the retarded into the community. The term "normalization" has been coined by Wolfensberger (1972) for this process. Services for the mentally retarded in Alberta, too, have been strongly influenced by the normalization movement (Kincaide, 1975). There has been a substantial decrease in the population of the Province's major institution, Alberta School Hospital--Deerhome. A Family Home Program has been started which constitutes a specialized form of foster care for mentally retarded children. Group homes and workshops are being developed and expanded. An Approved Home Program for accommodating semi-dependent adults is being developed. These and other developments reflect the major premise of the normalization concept, that handicapped persons should live their lives in settings and conditions which are as nearly normal as possible.

At the same time, it seems logical that if mentally retarded persons are to live in the community and cope adequately with the demands of society, they will need to be able to communicate effectively with the normal population. Unfortunately, communication deficits are common amongst the mentally retarded (Jordan, 1967; Matthews, 1971). In fact, delayed language acquisition and lack of language facility are taken as diagnostic evidence of mental retardation. In this vein, the vocabulary of retardates is less extensive than that



of normals (Wood, 1964), and the mentally retarded are slower to acquire a command of English grammar (Lovell and Bradbury, 1967; Lovell and Dixon, 1967). In short, inadequate speech and language skills constitute a major deterrent to the social, emotional and vocational adjustment of retarded children (Shiefelbusch, Copeland and Smith, 1967). The severity of the problem increases with the degree of mental retardation, and is particularly acute amongst institutionalized retardates.

Within the broad categories of "moderate and severe mental retardation", the largest single clinical group consists of persons with Down's Syndrome, commonly known as mongolism. Dunn (1973, p. 88) estimates that they comprise about one-third of all moderately and severely retarded. As a group they tend to be significantly inferior to non-Down's Syndrome children of comparable intelligence in terms of speech and language (Johnson and Abelson, 1969). Moreover, there is some indication (Lyle, 1959) that mongoloid children are particularly vulnerable to the effects of institutionalization.

There is a great need, then, for institutions to focus attention on the development of communication skills in all of their residents, and especially those with Down's Syndrome. Unfortunately, there is evidence that the institutional setting itself may actually have an inhibiting effect on language development. O'Connor and Hermelin (1963) noted that institutionalized retardates failed to develop adequate speech and language. Lyle (1959, 1960a, 1960b) made similar observations, attributing the low level of language development amongst institutionalized retardates to restricted opportunities for learning or using speech and restricted motivation to learn language



within the institutional setting.

There exists a paradox, then. It has become government policy to integrate the retarded into the community, and it is therefore incumbent upon institutions for the retarded to prepare the retarded for integration. Development of communication skills should be a major part of this preparation. At the same time, institutions have generally done little to assist in the development of adequate communication skills in their retarded clients, and may even by their very nature be part of the cause of inadequate language development. What can institutions do?

#### B. Purpose

In designing an institutional language-development program, one would hope that the literature would provide some clearcut direction. Unfortunately, in spite of the obvious importance of language development in the mentally retarded, the literature relating to it is not extensive. Reviews of the literature by Schiefelbusch (1965) and Jordan (1967) indicated that studies to that time had concentrated mainly on speech fluency and articulation with very little attention to language as a system of rules for generating phrases and sentences. It is only in the past few years that programs to assist in language development have been reported. Most of these have been behavior modification studies. Snyder, Lovitt and Smith (1975) have reported on twenty-three such studies between 1968 and 1973, and a number of the behavior modification studies reported in Hayden, Haring and Allan (1974) concern development of language skills. These have mostly involved very small numbers of children (most of the Hayden studies involve an N of 1) in clinical settings, and have required the use of



specially trained personnel on a one-to-one basis. An exception would be the work of Guess, Rutherford, Smith and Ensminger (1970) in which ward staff were used as language trainers for small groups of children in a classroom setting.

In contrast to these, there have been a few language development programs making use of enriched language environments. Noteworthy among these would be Lyle's (1960b) Brooklands project at the Fountain Hospital in London, and the Rhodes *et al* (1969) project in California. Each of these involved the use of existing ward staff, implementing changes in staff deployment so that staff-child verbal interaction was encouraged. The nature of the interaction, however, was not closely controlled.

The present study explores the value of language-modelling procedures presented as part of a language-enrichment activity program in helping language-deficient, retarded children to develop more adequate language. It goes beyond the Lyle and Rhodes studies by specifying the ways in which adults should verbalize to the retarded children with whom they are working.

### C. Theoretical Framework

Theories of language acquisition in children can be fitted into two major categories, "behaviorist" and "cognitive", or possibly three if one separates out the "nativist" theories from the cognitive ones (Wardhaugh, 1971). Behaviorist theories describe language acquisition in terms of operant verbal behaviors being reinforced and hence strengthened. Sequential utterances are developed through chaining. The generative nature of language is accounted for by response generalization. (Skinner, 1957; Peterson, 1968; Snyder, Lovitt and Smith, 1975). Feedback



from the environment serves as reinforcement for acceptable operant behaviors (Guthrie, 1971). Cognitive theories, on the other hand, contend that what is learned is not words or particular sequences of words but productive rules that enable the speaker to produce an infinite variety of sentences (Jenkins, 1969). The child is seen as having meanings to convey and as searching for an efficient way of coding his meanings verbally (Macnamara, 1972). He is seen as an active participant in the process of language acquisition. He uses the language models in his environment as raw material from which to build his implicit set of language rules (McNeill, 1968; Brown, 1973). He uses feedback from his environment not as positive or negative reinforcement, as in the S-R model, but as stimuli which are represented internally and are established as reference levels for the identification of correct and incorrect responses (Guthrie, 1971). The present study is based upon a cognitive view of language acquisition.

In the cognitive view, considerable importance rests with the nature of the language models presented to the child and the nature of the feedback (Brown and Bellugi, 1964). Models have been classified as of two sorts by McNeill (1970): "expansions" and "expatiations". In the former, the young child's syntactically imperfect utterance is expanded by the adult listener into a syntactically more adequate form, which then serves as a model for the child. The child's meaning is not altered by the rephrasing, but his syntax is. In expatiation on the other hand, the adult listener responds to the child's communication by enlarging upon or reacting to his intended meaning with a syntactically well-formed sentence. This sentence is not merely a rephrasing of a child's own utterance, but a new sentence which, again, can serve as a model for the



child. It is not clear which type of model is of most value (Brown, 1973). The present study uses both, separately, and attempts to assess their relative values.

#### D. Definition of Terms

##### 1. Severe Mental Retardation

According to the 1973 American Association on Mental Deficiency (AAMD) classification system, this term refers to persons whose measured intelligence is at least four standard deviations below the mean. Dunn (1973) defines the term with reference to adaptive behavior criteria, suggesting that severely retarded individuals "have the ability (1) to walk, toilet, dress and feed themselves; (2) to speak in a very elementary fashion; and (3) to perform simple chores in the home or in a very protective environment (p. 86)".

##### 2. Moderate Mental Retardation

According to the AAMD classification system, this term refers to persons whose measured intelligence is between three and four standard deviations below the mean. Dunn (1973) defines the term with reference to adaptive behavior criteria, indicating that moderately retarded individuals have "at least sufficient ability (1) to develop self-care skills in such areas as dressing, toileting, and eating; (2) to learn to talk and carry on a simple conversation, though they will have little verbal skill during their preschool years; (3) to guard themselves against common dangers in a protective environment or in familiar community settings; (4) to perform simple chores in such sheltered and closely supervised environments as the home, a workshop, and even occasionally a factory or business; (5) to learn a considerable range



of social graces so that they can function in public places; and (6) to travel unattended about the immediate neighborhood and over familiar routes (p. 85)".

### 3. Expansion

An expansion is an adult utterance, given in response to a child's "telegraphic" utterance, to include the parts which have been omitted. It provides syntactic information without altering the semantic content. McNeill (1970) suggests that although there is usually a number of possible adult sentences available as expansions, often one sentence best fits the extra-linguistic situation, and that sentence becomes the expansion. For example, to the child's utterance, "Mommy hat", the adult expansion would probably be, "That's mommy's hat". If the child's meaning has been correctly grasped, then the expansion presents a syntactically complete sentence that expresses the semantic intention of the child. Typically it retains the word order of the child and supplies the missing functors and inflections.

### 4. Expatiation

An expatiation model is a syntactically well-formed sentence given by an adult in response to a child's utterance. In expatiation, the adult responds to the meaning that seems to be intended by the child, judging by the child's utterance, gestures, and the extra-linguistic context. The expatiation does not rephrase the child's own utterance; rather, it responds to the semantic content of that utterance with a new utterance which carries the meaning forward. For example, to the child's utterance, "Mommy hat", an appropriate expatiation might be, "Yes, it's my new hat", or perhaps, "You've got a hat, too, haven't you?" Cazden (1965) distinguishes expatiation from expansions in the following manner:



Thus a treatment that focuses on grammatical structure (i.e. expansion) tends to limit the ideas to the presumed meaning of the child, and tends to limit the grammatical elements to those used by the child; focus on the idea (i.e. expatiation) by contrast, extends that idea beyond the presumed meaning of the child and introduces more varied grammatical elements to express those related meanings (p. 8).

## 5. Linguistic Competence

Competence refers to the ability all native speakers have of being able to understand and produce sentences which they have never heard before; it refers in this sense to the code which underlies all utterances in a given language (Hartmann and Stork, 1972).

## 6. Linguistic Performance

Performance refers to the realization of the code in actual situations where language is used, and thus relates to the utterances themselves (Hartmann and Stork, 1972).

## 7. Language Trainer

In the present study, a language trainer is an adult who participates with a child in a language training program and responds to each of the child's attempts at verbal communication in a manner consistent with the rules of the study, viz. with an expansion model, with an expatiation model, or with no language model, depending upon the treatment group in which the child has been placed.

## 8. Language Training Program

In the present study, language training program refers to a sequence of 44 half-hour sessions in which an adult and two children participate in play-type activities appropriate to the interests of children, in a language-stimulating environment, and during which the



language trainer attempts to respond to each child's utterances with appropriate language models.

#### 9. Receptive Vocabulary

This term refers to the words which have meaning for the child, even though he may not use them in his own speech.

#### 10. Expressive Vocabulary

Expressive vocabulary, on the other hand, refers to those words which are actually used by the child in his own speech. The child's expressive vocabulary is smaller than his receptive vocabulary.

#### 11. Fluency

In the present study, fluency refers to the quantity of language spoken by a child in a given period of time. It does not refer here to rhythmic speech without "disfluencies", but rather to the ease and willingness with which the child uses words in communicating with others.

### E. Statement of Hypotheses

The present study examines the usefulness and effectiveness of language modelling in a language-enrichment activity program in helping young moderately and severely retarded children to grow in linguistic competence and performance. It asks the question, "Does modelling help?" Beyond that, it asks which of two modelling procedures, expansion or expatiation, is more helpful, or are they equally beneficial?

The subjects were assigned at random to three training groups. Group A received expansion modelling. Group B received expatiation modelling. Group C received no consistent modelling.



If there is growth in language performance, one would expect this to be reflected in a number of ways: increased vocabulary in the child's speech; increased quantity of language (fluency); increased length of utterances; and increased syntactic complexity of utterances. Increases in linguistic competence may be further inferred from the child's performance on a test of receptive vocabulary and on a sentence-imitation test.

These research questions can be stated as null hypotheses in the following general form:

- (a) There is no difference in language maturity between Experimental Group A and Experimental Group B following treatment.
- (b) There is no difference in language maturity between Experimental Group A and Control Group C following treatment.
- (c) There is no difference in language maturity between Experimental Group B and Control Group C following treatment.

Applying these general forms to each of the measures used, we can state the following twenty-seven null hypotheses:

Hypothesis 1 (Active Vocabulary as measured by the Type Count, TC):

- 1(a) TC final mean score for Group A equals TC final mean score for Group B.
- 1(b) TC final mean score for Group A equals TC final mean score for Group C.
- 1(c) TC final mean score for Group B equals TC final mean score for Group C.

Hypothesis 2 (Active Vocabulary as measured by the Type Token Ratio, TTR):

- 2(a) TTR final mean score for Group A equals TTR final mean score for Group B.
- 2(b) TTR final mean score for Group A equals TTR final mean score for Group B.



- 2(c) TTR final mean score for Group B equals TTR final mean score for Group C.

Hypothesis 3 (Fluency as measured by the number of utterances per minute, UPM):

- 3(a) UPM final mean score for Group A equals UPM final mean score for Group B.
- 3(b) UPM final mean score for Group A equals UPM final mean score for Group C.
- 3(c) UPM final mean score for Group B equals UPM final mean score for Group C.

Hypothesis 4 (Fluency as measured by the number of words per minute, WPM):

- 4(a) WPM final mean score for Group A equals WPM final mean score for Group B.
- 4(b) WPM final mean score for Group A equals WPM final mean score for Group C.
- 4(c) WPM final mean score for Group B equals WPM final mean score for Group C.

Hypothesis 5 (Length of utterance, as measured by the Mean Length of Utterance MLU):

- 5(a) MLU final mean score for Group A equals MLU final mean score for Group B.
- 5(b) MLU final mean score for Group A equals MLU final mean score for Group C.
- 5(c) MLU final mean score for Group B equals MLU final mean score for Group C.

Hypothesis 6 (Language complexity, as measured by the number of complete sentences included in the corpus, NS):

- 6(a) NS final mean score for Group A equals NS final mean score for Group B.
- 6(b) NS final mean score for Group A equals NS final mean score for Group C.
- 6(c) NS final mean score for Group B equals NS final mean score for Group C.

Hypothesis 7 (Sentence complexity, as measured by Developmental Sentence Scores, DSS):



- 7(a) DSS final mean score for Group A equals DSS final mean score for Group B.
- 7(b) DSS final mean score for Group A equals DSS final mean score for Group C.
- 7(c) DSS final mean score for Group B equals DSS final mean score for Group C.

Hypothesis 8 (Receptive Vocabulary, as measured by the Peabody Picture Vocabulary Test, PPVT):

- 8(a) PPVT final mean score for Group A equals PPVT final mean score for Group B.
- 8(b) PPVT final mean score for Group A equals PPVT final mean score for Group C.
- 8(c) PPVT final mean score for Group B equals PPVT final mean score for Group C.

Hypothesis 9 (Sentence complexity, as measured by the Imitation Test, IT):

- 9(a) IT final mean score for Group A equals IT final mean score for Group B.
- 9(b) IT final mean score for Group A equals IT final mean score for Group C.
- 9(c) IT final mean score for Group B equals IT final mean score for Group C.



## CHAPTER II

### THEORETICAL PERSPECTIVES AND RELATED STUDIES

It has been proposed in the previous chapter that there is a need amongst institutionalized mentally retarded children for training programs that will improve their language skills and make them more nearly "normal". Moreover, it was suggested that a language training program based upon a cognitive view of language acquisition might be a useful type of program. The effectiveness of two types of language modelling procedures might be assessed through the application of nine types of language measures. The research question has been posed in twenty-seven null hypotheses. In the present chapter, a more extensive review is given of the literature relating to language development and mental retardation, to language development and institutionalization, to theories of language acquisition, and to other language training programs with a similar theoretical base.

#### A. Language Development and Mental Retardation

Communication deficiencies are common among mentally retarded children (Spradlin, 1963; Jordan, 1967; Matthews, 1971). There are many references in the literature to speech errors. Spradlin (1963) estimates that speech defects, primarily articulation and voice problems, are present in from 57 to 72 per cent of institutionalized mental defectives, and in between 72 and 82 per cent of severely retarded children in parent-sponsored day schools. Language deficits are also common in retarded children. Although percentage estimates of their frequency are not readily available, Lenneberg (1964a) suggests that



delay in acquisition, at least, is universal amongst retarded subjects. Lyle (1960a) notes that all aspects of language are affected. Lovell and Bradbury (1967) and Lovell and Dixon (1967) found that mildly mentally retarded adolescents were significantly behind much younger normal children in the acquisition of morphological rules. Mein and O'Connor (1960) found the expressive vocabularies of severely subnormal children to lack variety, when compared with those of younger but normal children. Moreover, the retarded subjects used a higher proportion of nouns than of verbs when compared with normal children of the same mental age. In this respect, the retarded subjects were functioning as very young children.

A number of writers suggest that language acquisition in the retarded follows the same developmental sequence as in normal children but at a slower rate. Recent reviews by Cromer (1974) and Miller and Yoder (1974) support this view. O'Connor (1972) indicates that development is linked to mental age. Lenneberg (1964a) concurs, and suggests that a mental age of five years "leaves no effect upon the principles of speech production or language comprehension (p. 159)".

Although it is widely accepted that there is a close relationship between language deficits and mental retardation the nature of the relationship is not well understood. Some writers have suggested specific types of defects which would interfere with language development. Luria (1961) attributes limitations in language development to "massive cerebral lesions experienced in the intra-uterine period or in early childhood (p. 127)". Memory deficits have been suggested as possible causes of lack of language facility. Graham (1968) suggests that limitations in short-term memory in retardates limit their ability



to process sentences. Bowerman (1974), too, lists a number of cognitive deficits which could underlie the retardates's language limitations.

Other writers have suggested a lack of innate ability to acquire language. Lenneberg (1964b) speaks of a "very special type of understanding" that is necessary for understanding morpho-phonological rules, and Rosen (1974) suggests that there may be an innate capacity for language which is lacking in retardates. This "nativist" position, however, is not strongly supported in recent literature.

The speech and language problems of trainable retarded children are particularly pronounced in children with Down's syndrome. O'Connor (1972) has noted that mongols "always have a somewhat lower verbal than performance mental age", and Benda (1965) has noted that speech development is particularly slow in mongoloids. McCarthy (1965) found evidence of poor vocal encoding skills. She compared the performance of mongoloid and nonmongoloid subjects on various subtests of the Illinois Test of Psycholinguistic Abilities, and found the mongoloids' motor encoding to be significantly superior to their verbal skills. Reviews of the literature by Belmont (1971), Cromer (1974) and Villiger and Mathis (1972) lend support to the views that Down's syndrome children are linguistically inferior to nonmongoloid retardates, that they have relatively strong visual-motor abilities, and that they have relatively weak auditory-vocal abilities. There is also some indication (Lyle, 1959) that Down's syndrome children are particularly susceptible to the limiting effects of institutionalization discussed below. Benda (1965) and Brinkworth (1973) would have predicted as much, because they both argue that the mongoloid child needs stimulation, which is often significantly lacking in institutional environments.



## B. Institutionalization and Language Development

There are indications that language deficits are even more widespread and severe amongst institutionalized than non-institutionalized retardates. Rhodes *et al* (1969) noted that their institutionalized Down's syndrome children had language skills that lagged far behind those of similar children in nearby day-schools. O'Connor and Hermelin (1963) made similar observations concerning their older institutionalized retardates.

The nature of this relationship is unclear. It may be that retarded children with severe language deficits are more readily referred and admitted to institutions than are those who can communicate more effectively. On the other hand, it may be that institutions *per se* inhibit language development. Zigler (1966) reviewed a number of studies which suggested that institutions have negative effects on retardate behavior. Lyle (1960a) has identified at least two aspects of institutional life which may be negative influences: restricted opportunities for learning and using speech and language, both in the classroom and in informal settings; and restricted motivation to learn or to use language as a means of communication. Others would add to this the lack of language models to learn from. Tizard *et al* (1972), studying young normal children in residential nurseries, found a relationship between the children's language comprehension scores and the frequency and quality of staff verbal behavior. Comprehension was improved if there was a high rate of informative talk by the staff and if the staff frequently spoke in answer to the children's requests. Tizard *et al* found that the quantity of verbalization in the residential



nurseries was generally adequate, and often greater than in normal family situations.

There is reason to doubt, however, that either quantity or quality of verbalization is adequate in many institutions for the retarded, even though staff-to-resident ratios may have been substantially improved in recent years. Daily *et al* (1974) estimated that the average resident on the ward was engaged with staff in a positive or social-play interaction in less than one per cent of the intervals observed. For the most part there was virtually no verbal interaction and the ward experience, they feel, served as an inadvertent extinction program for virtually all of the behaviors engaged in throughout the day. Similarly Flouriot (1973) found that there was very little reinforcement for children's productive language on the wards. Blindert (1975) found that the primary function of ward staff's verbal behavior was to control residents' behavior. Only a small fraction (about one-fifth) of attendants' responses were of a sort that might serve as language models to help children increase their language skills. There is evidence that the situation is still worse for relatively nonverbal residents. Belmont (1971) reports evidence that adults respond differentially to retardates of high and low verbal ability, paying relatively little attention to low-verbal children. In short, it seems that many institutions fail to provide adequate linguistic environments for their residents.

### C. Theories of Language Acquisition

Theories of language acquisition can be grouped into two major categories, behaviorist and cognitive. The formulation of such theories



is fairly recent, according to Wardhaugh (1971), with the multitude of studies reviewed by McCarthy (1954) being mainly descriptive and atheoretical. Since McCarthy's review, major theoretical statements have appeared in each category. Skinner's Verbal Behavior (1957) presented the behaviorist view that language behaviors are acquired through operant conditioning. The cognitive position, which views the child as actively searching for rules in language and constructing his language system from the language models around him, has been presented by Chomsky (1957), McNeill (1970), Brown (1973) and others. Some of these have suggested that man has an innate capacity for language (eg. McNeill, 1968) or even that certain basic sentence relations are innate (Brown, Cazden and Bellugi-Klima, 1969). This "nativist" position is considered here as a part of the broader cognitive category.

The behaviorist position has been influential in many studies of verbal learning. It has also been of considerable utility in the development of the early stages of language, especially "naming" behavior and one-word speech. Macaulay (1968) devised an experimental program for eleven retarded children of ages nine to fifteen years, in which isolated speech sounds were encouraged through the use of tangible reinforcers and the speech sounds were then chained to form simple words. Crozier (1970) used operant techniques to build receptive vocabulary in young mongoloid children. Risley and Wolf (1968) used operant procedures to advance retarded children from the level of echolalic speech to naming in response to pictures and objects.

Operant procedures have not been limited to the level of speech sounds and vocabulary development. Baer and Guess (1971) used such



techniques to teach comparative and superlative adjectival inflections to three severely retarded, institutionalized children. Kolstoe (1958) undertook a more comprehensive study with 34 institutionalized mongoloid children in which the children were reinforced for appropriate labeling behavior, word association, and gestural conversation. Schiefelbusch (1965) has summarized several other such studies, and Sailor *et al* (1973) review a decade of related research.

Nevertheless, operant approaches seem to have been more useful in establishing rudimentary language behavior and less so in establishing sequential speech. Risley and Wolf (1968) found operant procedures to be highly effective in establishing naming behavior, but apparently not necessary for the growth of phrases. The expansion of response units from words to phrases takes place, they found, without explicit training. It may be that children who have achieved a one-word level of response may then bring into play imitative behavior, with whole phrases being imitated and then reinforced. Peterson (1968) has argued, for instance, that whole sequences need not be acquired by chaining. They can be acquired, instead, full-blown by imitation of an adult model. The development of an imitative repertoire, is, in fact, a necessary condition for language acquisition, according to Peterson. His position can be summarized as follows:

- (a) elements can be implanted through operant conditioning;
- (b) a tendency to imitate can be developed in the same manner;
- (c) imitation itself takes on secondary, reinforcing qualities, by association of speech with mother's speech, and of mother's speech with mother giving primary reinforcers;
- (d) complex verbal behaviors are developed through imitation, in



which "goodness of fit" to the adult models is reinforcing.

This behaviorist attempt to account for more complex levels of language, however, would be criticized by Chomsky (1964) and others as simplistic. Theorists of the Chomsky persuasion would point out that although some children may learn some verbal sequences by imitation in the way suggested by Peterson, true language acquisition requires that they learn more than an imitative repertoire; they must learn a set of rules which enable them to generate utterances which are, at least for the speaker, entirely novel, yet capable of being understood by his listeners. They would argue that the stimulus-response model is inadequate, and that some cognitive theory would be more adequate.

The behaviorist point of view has also been criticized for its emphasis on the importance of reinforcement. Ervin-Tripp (1971), for example, says that if reinforcement were the dominant factor in language development, the speech of children should be mainly composed of "mands" or requests for food and services, and this is clearly not the case.

Cognitive theorists would argue that the child is searching for generative rules, actively seeking out relationships and generalizations, and using the language models presented to him as the raw material in his construction of a language system. Adult responses are feedback which can serve as models against which to test hypotheses about language, rather than as reinforcers for acceptable operants (Guthrie, 1971).

The magnitude and complexity of this task has led some theorists to propose an innate propensity for language (eg. Miller, 1964; McNeill, 1968; Brown, Cazden and Bellugi-Klima, 1969), requiring only a releaser



to set it in operation. So long as the focus was on the acquisition of rules of syntax with relatively little regard for meaning, some innate propensity or "language acquisition device" seemed necessary to account for the child's considerable linguistic achievements. Many more recent writers, however, have drawn attention to the importance of the cognitive and semantic bases of language. Macnamara (1972) argues that the infant uses "meaning as a clue to language, rather than language as a clue to meaning". The infant first determines the meaning which the speaker intended to convey to him, independent of language, and then works out the relationship between meaning and language. Macnamara argues that in the period when infants begin to learn language, their thought is considerably more developed than their language. The view that thought and language develop separately, at least initially, is shared by Vygotsky (1962), Olson (1970) and others. Moerck (1973) has reviewed the evidence from a variety of sources that there is a high degree of cognitive development in the preverbal child. He also draws attention to the fact that the child communicates nonverbally long before he acquires language. His first attempts at expressive language are supplemental to existing means of communication. The child's task is to learn the linguistic mode of communicating, a task which is made easier for him, according to Moerck, "as adults model the correspondence between both modes of encoding untiringly in simplified form".

In the language-learning task, cognitive theorists see the child as an active participant, a theorist who constructs his language and constantly tests it against the language models he receives from around him (the feedback that Guthrie (1971) discusses). Brown and Berko (1960) compare the child to a linguistic scientist studying



some finite set of utterances belonging to the language and developing a set of rules to account for the relationships among the elements. Although the child does not formulate his linguistic rules explicitly, he is still very much learning the rules of the language. As Searle (1969) points out, "to learn and master language is to learn and to have mastered these rules (p. 12)".

This happens at an early age for most children, and it happens rapidly. For normal children the period from eighteen to thirty-six months seems to be the most active period. By the end of that time, according to Brown and Bellugi (1964), some children can produce all of the major varieties of English simple sentences up to a length of ten or eleven words. We get a picture, then, during this important period, of the infant trying to match language to meaning, trying to discover regularities and system in language, deriving tentative hypotheses, trying them out against adult models, revising, and practicing to achieve mastery. Ruth Weir's (1962) young son's "language in the crib" has given us a fascinating glimpse of the infant linguist at work. As the child's language becomes increasingly mature, it displays an increasing number of the rules of the model language until, by thirty-six months, it may be nearly mastered.

The vastness of the task to be mastered by the child can perhaps be appreciated more fully when we consider the variety of systems to be learned, for the language system can actually be thought of as several systems: phonemic, morphemic, syntactic, and semantic. As Jenkins (1969) points out, these systems are not independent of each other, yet not completely dependent either. They are interdependent, but we can consider them separately and look for signs of growth in each.



Jakobson and Halle (1956) have provided a framework for judging maturity in the phonemic system through observing the number of phonetic contrasts that have been acquired. This offers one possibility for estimating advances in maturity of language. We can also assess language growth by observing the number of words children use. Cazden (1968) uses "mean length of utterance" (MLU) as one measure of maturity. Beyond MLU, there are other developmental sequences, relating to the nature and organization of the words used. As utterances increase in length from one word or two and more words, the way in which the words are organized begins to take on importance. As Sapir (1921) pointed out long ago, juxtaposing two or more words in a definite sequence without any other modification is a very economical method of conveying some sort of grammatical notion. In grasping for a means to express a relationship verbally, the child uses word order. Sinclair and Bronckart (1972) comment on the universality of the subject-verb-object word order in early speech. We can assess maturity of language development by observing how much of this SVO relationship is made explicit and how far the child has been able to move beyond the fundamental subject-verb-object word order alone to express relationships.

Several other kinds of expression may provide useful measures of language maturity, as well. Miller and Ervin (1964) have indicated that there is a developmental sequence in the acquisition of adverbs, with locative adverbs being acquired first, followed by temporal adverbs and then adverbs of manner. The development of questions in a child's speech may also follow a predictable sequence. Brown (1968) and also Miller and Ervin (1964) and Klima and Bellugi (1966) have studied the development of questions, from rudimentary dependence upon



rising intonation plus context, to much more well-formed questions complete with auxiliary verbs and adult transformations. The nature of the sequence, however, is not yet entirely clear. Similarly, the expression of negatives seems to follow a developmental sequence. Klima and Bellugi (1966) have traced three stages. Bloom (1970) found a sequence in the purposes for which negative expressions are used: first to indicate nonexistence ('Ball all gone'), next to indicate rejection, and finally to indicate denial.

At the morphological level, Miller and Ervin (1964) have observed a sequence in the acquisition of class markers, such as possessive and plural suffixes, articles, and the "ing" suffix. Cazden (1968) has charted the acquisition of five inflections (plural and possessive inflections in nouns, and present progressive, regular past indicative, and present indicative inflections in verbs) in the three children of the Harvard study.

In all these systems, then, there is evidence of developmental sequences that show some stability from child to child. Increasing control of phonetic contrasts, increasing length of utterances, increasing use of inflections, and increasing use of various transformations all provide evidence that the child is growing in his command of the several systems that comprise language.

If children depend upon a linguistic corpus to provide the raw data from which to formulate hypotheses about the systems of language, the nature of the corpus may be of some significance. There is considerable evidence that children normally are presented with language models that are adjusted to their needs and present capabilities. Morehead and Morehead (1974) review some of the evidence concerning



the importance of the child's verbal interaction with the major care-taker. Nelson (1973) found that there was a very strong tendency for mothers to adjust their speech to the perceived needs of their young children, especially in terms of mean length of utterance, and to adopt what she calls a "child-talk code". Snow (1972) found mothers' speech to their children to be simpler, more redundant and less confusing than normal adult speech.

It has been argued (e.g. Brown and Bellugi, 1964) that what is of key importance is the presentation of models by significant adults during close contact. These models may take the form of either "expansion" or "expatiation". Adults often respond to children's syntactically imperfect communications by rephrasing the idea in a syntactically more acceptable manner without extending the meaning. For example, to the child's "Mommy hat", the response might well be, "Yes, that's mommy's hat" or, again, "Alright, mommy will get your hat", depending on the adult's perception of the child's meaning. That would be an expansion. "Expatiation", on the other hand, refers to responses which enlarge upon or react to the child's intended meaning rather than simply paraphrase his own utterance. A wide variety of expatiations may be possible following any given utterance. If the child's utterance was simply a naming or designative one (i.e. "(That is) mommy('s) hat.") then the adult may respond with another designative statement, perhaps enriched by a descriptive word, which would extend the meaning. Examples would include, "You have a hat, too" and "It's a nice red hat, isn't it?" The adult might also have responded with a categorizing statement (e.g. "I'm wearing my hat on my head", or "I have a red coat, too"), or with a statement of comparison (e.g. "My



hat's bigger than yours, isn't it." If the child's utterance was intended to mean, "Mommy, get me my hat." then a suitable expatiation might be another action--object statement (e.g. "I'll get you your big boots, too."). Another possibility would be a statement which recognizes the child's reference to some future event (e.g. "Do you want to go outside?"). Clearly, there are many more expatiations than expansions possible in response to a child's utterance. However, in use with retarded language learners, the expansion method may offer the better match with the child's current usage. The present study investigates the relative merits of expansion and expatiation modelling.

The importance of expansion and expatiation is open to argument: Cazden's (1965) and Feldman's (1970) studies, discussed below, failed to provide convincing evidence of their utility. Cazden (1971) has since criticized her own study on the grounds that the sample was small, and reaffirmed her view that the extent to which parents provide grammatical expansions for their child's telegraphic utterances is correlated with the child's rate of language development. Malouf and Dodd (1972) similarly note the "quite gross" conditions of the Cazden and Feldman studies, and indicate the need for more closely controlled laboratory studies. In their own study, both imitation and expansion were superior to mere exposure to language. Nelson *et al* (1973) tested the effectiveness of two modelling procedures in helping nursery-school children increase their language performance. In one treatment procedure, the language trainer presented the child with "recast sentences", very much like the expansions of the present study. In the other procedure, each child utterance was responded to with a new sentence carefully designed to avoid the use of the child's own



contentives, but semantically related to the child's utterance, i.e. very much like the expatiations of the present study. Nelson *et al* found the recast sentences procedure to be significantly better than the no-treatment control procedure, lending support to the idea that expansion-type models may be useful to the language-learning child.

#### D. Other Language-Training Programs

Based on this cognitive view of the child deriving an implicit awareness of the rules of language from the language models with which he is presented, especially in close interpersonal situations, one might hypothesize that retarded children fail to develop adequate language because of lack of models. Even in their own homes, it may be that parents of retarded children have long since stopped modelling language for their child by the time he is mentally mature enough to profit from their models. In institutions especially, however, there is an obvious lack of both language models and close interpersonal communicative situations. Perhaps gains in language maturity could be brought about in children who are "ready", i.e. are capable of putting two words together at least, by presenting them with language models in situations where they are in close personal contact with interested adults and are engaged in activities which are meaningful to them. The present study tests that proposition. What evidence is there in the literature to support the idea?

There have been several studies which have used enrichment of the language environment as treatment. Lyle's (1960b) group of sixteen children who were placed in the experimental Brooklands cottage unit at Fountain Hospital showed improved language and verbal ability.



Emphasis was placed on interpersonal relations and motivation to communicate verbally. No direct instruction was given in speech and language but the children had many opportunities to talk to the staff and to other children and were encouraged to do so. Rhodes *et al* (1969) designed a language enrichment program for ten institutionalized mongoloid children in which ward staff were redeployed in such a manner that adult-child interaction was greatly increased. Staff were given inservice training on the importance of language stimulation. Improved language ability was noted after a six-month period, as well as marked increases in I.Q. scores. Smith (1962) tested the efficacy of an enrichment program for educable mental retardates in a non-institutional setting, measuring language growth by the Illinois Test of Psycholinguistic Abilities. Three months of training yielded significant increases in ITPA scores. The Smith study is more carefully designed than some others of the enrichment sort, paying closer attention to matched controls and measurement of language growth.

Finally, Heber (1972) reported a community-based enrichment program in which the children of mildly mentally retarded mothers were selected for a language enrichment program which took the children from their homes each day to a day-care program with a carefully designed stimulation program. The study was carefully designed and utilized a control group. Measures of language growth included the total number of different words per ten-minute unit in free-speech samples; ability to repeat sentences varying in length and grammatical complexity; and a test of comprehension of sixteen different grammatical features or rules of the English language. Heber noted that the most striking differences in the performance of the experimental and control



children were reflected in the measures of language performance.

There have been, then, a few enrichment studies in which it seems to have been assumed that the retardate is capable of constructing a language system if he is given sufficient language stimulation. These studies have sometimes lacked adequate measures of language growth, and have generally been vague about the nature of "enrichment". The present study tests the efficacy of two stimulation (modelling) procedures as defined in the literature (e.g. McNeill *et al*) in a language-enrichment program in which the nature of the enrichment has been defined.

The design of the present study was influenced strongly by two studies with intellectually normal children. Cazden (1965), working with Negro children aged 28 to 38 months from language-poor environments, explored the relative value of expansion and expatiation modelling, and the merits of either of these over a no-treatment control condition. Treatment sessions of 30 to 40 minutes duration occurred daily over a three-month period. Cazden used a sentence-repetition test and five indices of linguistic maturity based on free-speech samples as measures of language growth. The latter included mean length of utterance as well as noun-phrase, verb-complexity, copula, and sentence-type indices. Cazden found expatiation to be superior to expansion.

The second study, by Feldman (1970), was a direct outgrowth of Cazden's (1965) study. Feldman used three experimental treatments (100 per cent expansion, contingent expansion, and expatiation) and a no-treatment control group. McNeill (1970) has suggested the possibility that in Cazden's study the 100 per cent expansion condition was more harmful than helpful. McNeill claims that middle-class parents



normally expand about thirty per cent of the speech of the children.

One can ask why this rate is not higher, perhaps 50 to 70 per cent. One reason must be that not everything said by a child is interpretable in the extralinguistic context. In such circumstances adults would tend not to expand. McNeill goes on to argue that 100 per cent expansion may be less effective than contingent expansion. "Young children might not pay attention to such an avalanche", he suggests, "and even if they do pay attention some utterances . . . . must have been inappropriately expanded (p. 110)." In that case, McNeill would suggest, the child would be confused by the parent's expansion rather than helped by it.

With these considerations in mind, Feldman introduced a contingent-expansion group into her study, for whom only those utterances were expanded for which the intended meaning was reasonably clear from the context. Feldman does not give the percentage of utterances actually expanded in this treatment condition, but no doubt it was less than 100 per cent and may have been closer to the 30 per cent that McNeill says is typical for middle-class parents. Feldman found that none of the experimental treatments was superior to the no-treatment control condition, but her study can be criticized on at least two important points. First, she used rather limited measures of language growth, and may therefore have failed to detect increases in language maturity. Further, the treatment period was very short (twelve half-hour treatment sessions over a two and one-half week period). One may question whether or not it is reasonable to expect to find differences after so short a period. Her study is of interest here because of her use of the contingent-expansion treatment, which is



closer to the situation in the present study than is 100 per cent expansion.

Several aspects of the cognitively-based language modelling procedures used in the present study distinguish them from training programs based on an operant conditioning paradigm. First, there is no use made of tangible reinforcers in the present study. Since some adults find the extensive use of such reinforcers objectionable, the present methods should be more acceptable to them. Second, it may be possible for the child in an operant conditioning program to focus on the reinforcement itself, whereas in the modelling procedures used here the focus is on the communicative act. Finally, the language models used in the present study are generally related to the child's own meaning at the time of presentation. The child's own interests and activities provide the semantic content for the model sentences. The current emphasis on cognitive and semantic bases for language acquisition supports the pairing of language models with meaningful situations (e.g. Morehead and Morehead, 1974; Moerck, 1974; Stemmer, 1973). In some behavior modification approaches, in contrast, sentences presented as models may not be related to the child's interests or meaning.

#### E. Summary

Language retardation is a very common condition amongst the mentally retarded, and particularly so amongst the institutionalized retarded population. It has been suggested that institutional life itself may be a contributing factor because of the limited language models available and the limited motivation for institutional residents



to use language and grow in language maturity. Language deficits in the retarded include articulatory disorders, vocabulary limitations, and delay in the acquisition of mature grammar.

A review of various theories of language acquisition reveals two broad classes of theories: behaviorist and cognitive. The former type argues that the child acquires language through the reinforcement of operant verbal behaviors, chaining, and the reinforcement of imitative sequences. The latter type argues that the child actively seeks out generative rules of grammar and gradually constructs a grammar which matches that of a mature speaker of the language. Growth toward maturity can be observed in a number of ways, including the increasing variety and extent of vocabulary, the increasing length of utterance, and the increasing command over various grammatical constructions.

A few language training programs have been cited involving retarded subjects in which enriched language environments have been employed. Reference was made also to two studies with normal subjects in which expansion and expatiation modelling were evaluated. These various cognitively-based language studies have served as background for the present study which seeks to assess the relative efficacy of expansion and expatiation modelling in a language training program involving enrichment activities.



## CHAPTER III

### THE DESIGN OF THE STUDY

The present study was conducted in an institutional setting with children who have been diagnosed as moderately to severely mentally retarded. It was necessary to select or to devise measuring instruments to assess their initial and final levels of language maturity, to specify language modelling techniques, to train the language trainers, and to prepare an activity program for the language trainers to follow. All of these aspects of the study will be considered in the sections that follow.

#### A. The Setting

Alberta School Hospital, located in Red Deer, is an institution for the care and training of mentally retarded children. For many years it was the only such facility in the province, accommodating children from all over Alberta as well as a few from the Northwest Territories. Later, a second institution, Deerhome, was opened on adjacent property to accommodate adult retardates. By the early 1970's, the total population of these two institutions was approximately 2200, with about 800 of these in Alberta School Hospital.

In organization and treatment orientation, Alberta School Hospital and Deerhome followed the "medical model". The directors of the institutions were medical doctors; the senior ward staff were mental-deficiency nurses; the various program elements were referred to as therapies, e.g. recreational therapy, occupational therapy. Although there was a school program at A.S.H., it served only a small number of



higher functioning children.

Early in the 1970's, the continent-wide movement toward "normalization" became a significant influence in Alberta as well. First, there was pressure to reduce the size of the existing institutions at Red Deer. This would be done by opening new, smaller facilities in other parts of the province, closer to the home communities of the residents. Second, a concerted effort would be made to provide support services to families so that retarded persons could remain in their homes rather than being institutionalized. Third, there would be an attempt to increase substantially the amount of contact that retarded persons have with the community. Fourth, in the institutions themselves, there would be major changes in facilities, in organization, and in programs so as to make them more rehabilitative and less "institutional".

The present study was undertaken at a time when these various changes were under way. The institutional population had already been reduced by over 400, largely by moving higher functioning retardates back to their homes or to foster homes or community group homes. There remained in Alberta School Hospital 392 residents up to the age of 18 years, many of whom were severely or profoundly retarded. Thirty-seven of them had Down's Syndrome. A survey of the institutional population and the resources of the community, carried out in 1974-'75 (PARD, 1975) included a breakdown of the institutional population by degree of retardation (see Table III - I). This showed that 59.4 per cent of the residents were "moderately" or "severely" mentally retarded.

These figures were further broken down by age group (see Table III - 2). The majority of residents (86.58 per cent) were between the ages



Table III - I. Proportion of Alberta School Hospital Residents in each of Five Functional Level Categories.

Functional Level	Number	Percentage
0 Borderline	33	8.4
1 Mild	29	7.4
2 Moderate	57	14.5
3 Severe	171	43.6
4 Profound	102	26.1
Total	392	100.0

Table III - 2. Numbers of Residents of Alberta School Hospital by Functional Level and by Age Group.

Functional Level	0-3 yrs.	4-6 yrs.	7-9 yrs.	10-12 yrs.	13-15 yrs.	16-17 yrs.
0 - Borderline	0	0	0	5	11	7
1 - Mild	0	0	4	6	10	9
2 - Moderate	0	1	4	7	21	22
3 - Severe	2	4	20	43	62	40
4 - Profound	0	2	14	33	36	17
Total	2	7	42	94	140	95
Percentage of Total	0.53	1.84	11.05	24.74	36.84	25.00



of ten and seventeen years, inclusive, with 61.58 per cent of them ranging in age from ten to fifteen years.

A second survey, carried out by the A.S.H. psychology department, looked at the needs and capabilities of 168 "trainable" children who were being considered for possible inclusion in a school program. Communicative ability was included in the survey, as shown in Table III - 3. Clearly, the number of children in this group who would be potential candidates for the present study was not large.

Although by 1974 there had been a substantial reduction in the number of residents at A.S.H./Deerhome, and major renovations to the physical plant were in progress, there still had not been much change in the program. The survey mentioned above (PARD, 1975) noted that "until the new planning took place, formalized training was borne by the school and sense training units, and was limited to the higher grade educables and some trainables". At the time of the survey, 90 to 95 children attended school daily (80 educable mentally retarded children and 10 to 15 trainable children) and another 90 children (mostly trainable) attended sense training classes for one-half hour to one hour per day. The program is described by the report as "formal", with little spontaneity and little student interaction. "Students are generally discouraged from talking amongst themselves."

The institutional program included other elements in addition to education and sense training. The same report (PARD, 1975) indicated the levels of residents' participation in these activities (see Table III - 4).

The survey did not specify the length of time each participant was involved in a program, or the frequency, so that one must be



Table III - 3. Number of A.S.H. Residents by Level of Communicative Ability

Level	Number
Nonverbal	114
One-word utterances	14
Short phrases	26
Sentences	10
Reads and writes	0
Information incomplete	4

Table III - 4. Number of A.S.H. Residents Participating in Institutional Programs

Program	Number
Sense training	98
Recreational program	274
Occupational therapy	179
Community program	20
Speech training	23
Play programs	122



careful not to read too much into the figures. Moreover, the statistics included those who were about to participate in the immediate future but had not yet been involved in the program. The numbers of children actually involved in various programs would be smaller than those in Table III - 4. By functional level, the degree of participation is shown in Table III - 5.

In summary, when the present study was undertaken, the institutional population at Alberta School Hospital had already been substantially reduced in size. Of approximately 400 children under the age of 18 years, 37 were diagnosed as Down's Syndrome, and 228 were "moderately" and "severely" retarded. Of these, a much smaller number exhibited language at a two-word or better level. A majority of these children were involved in two or more types of programs within the institution for at least a little time each week, but very few indeed were involved in language training. There was a suggestion (PARD, 1975) that even in the school program attended by the more intellectually capable children, language training and activities which would facilitate language development were quite inadequate. There was virtually no formally-established language training program in the institution.



Table III - 5. Percentage of A.S.H. Residents Participating in Institutional Programs, by Functional Level

Functional Level	No program	1 program	2 or more programs
Borderline	0.0%	3.0%	97.0%
Mild	0.0	3.5	96.5
Moderate	2.0	9.0	89.0
Severe	15.3	22.8	61.9
Profound	78.7	16.5	4.8



## B. The Subjects

It was the original intention of the study that only institutionalized retardates should be included who had Down's Syndrome and who had developed language to a minimum level of two-word sentences. By the time the study was under way, there had been a substantial reduction in the institutional population. Some 400 children, mainly higher functioning children, had been removed from Alberta School Hospital to various communities throughout Alberta. Many of the Down's Syndrome children remaining were lower functioning children who had not developed language to the required minimum level. It became apparent that it would not be possible to find 30 children who could satisfy the requirements originally intended. Therefore, it was decided to include children of mixed etiologies.

With the assistance of personnel from the psychology department of A.S.H., a survey was made of the various wards searching out children who had achieved the level of two-word utterances. A meeting was held with ward supervisors to explain the nature of the study and the kinds of children who were being sought for inclusion in it. It was explained to them that the children need not use two-word speech all the time, but simply that they should have shown the ability to do so at least some of the time. With this background, the ward staff then prepared lists of possible candidates on their wards.

Next, ward personnel were asked to rate these children on the two bases of language maturity and comprehensibility of speech. Regarding maturity of speech, they were asked to rate each child as being capable of one-word speech, two-word speech, three- or four-word speech, or well-formed sentences. Regarding comprehensibility of speech, they



were asked to rate each child as "very unclear", "can be understood", or "very clear speech".

It was decided to include those children who were capable of two-, three-, or four-word utterances and whose speech at least "could be understood". Of a total of 59 children rated (on six wards), 35 were found who met these criteria. Of these 35, two were scheduled to be removed from A.S.H. within a few weeks, leaving 33 to be included in the study. During the initial language-sampling interviews which followed, it was found that one child actually had rather advanced language ability and could read fairly well. He was considered not eligible for the study. Two others were very unco-operative, refusing to speak or to co-operate at all in language-sampling interviews. They too were omitted, leaving 30 children.

As I.Q.'s were not readily available for many of the children, no attempt was made to group the children according to I.Q. Man had not been assessed since the time of admission, and even at that time the diagnosis was sometimes based on a physician's clinical impression rather than a full psychological assessment. In the A.S.H. psychology department's survey of 168 children, referred to in the previous section, an attempt was made to test all 168 children with the Revised Stanford Binet scale. As 123 were found to be untestable, it was not really possible to group children on the basis of I.Q. Of those for whom there was some functional label available, four were classified as "morons", sixteen as "imbeciles", and two as "idiots". For the thirty children included in the study, initial test results on the Peabody Picture Vocabulary Test indicated a mean mental age score of 36.9 months with a standard deviation of 15 months.



Two variables were felt to have a possibly significant effect on the language development of the children. First, the literature suggests that an etiology of Down's Syndrome is likely to be accompanied by specific language deficits. Second, the number of years of institutionalization may have an effect on language development. Therefore, the 30 children chosen for the study were divided first into two etiological categories, "Down's Syndrome" and "Other". Then each of these were broken down into three categories based on years of institutional care, "two years or less", "three, four or five years", and "six years or more". The distribution of the thirty children is shown in Table III - 6.

The children also varied with respect to chronological age at the time of admission to the institution. Only two in each group were admitted at age three years or younger. This information is summarized in Table III - 8, below.

The children in each "cell" were then assigned at random to the three treatment groups, "expansion" (Group A), "expatriation" (Group B), and "control" (Group C). In this way, each group contained approximately equal numbers of Down's Syndrome children (five in Group A, six in Group B, and five in Group C); and equal numbers of children in each category of years of institutionalization.

Since the children were to be taken in pairs for the language training sessions, it remained to divide the ten children in each group into five pairs. It was felt that taking the children in pairs for language training would increase the social interaction, the verbal interaction, and hence the number of opportunities for language modelling. Assignment to pairs was done in consultation with ward staff. Some of



Table III - 6. Distribution of Subjects by Length of Institutionalization and by Etiology

Years of Institutionalization	Etiology		Total
	"Down's Syndrome"	"Other"	
6 years or more	10	8	18
3, 4, or 5 years	3	3	6
2 years or less	3	3	6
Total	16	14	30

Table III - 7. Assignment of Subjects to Pairs for Language Training, by Treatment Group, with C.A. and Sex Indicated in Parentheses.

Group A		Group B		Group C	
Gail R.	(13,F)	Michael B.	(15,M)	Darcy L.	(11,M)
Francis T.	(11,M)	York L.	(15,M)	Arthur S.	(14,M)
Charles W.	(16,M)	Wendy C.	(12,F)	Jane O.	( 8,F)
Lyle M.	(11,M)	Marie S.	(10,F)	Cheri B.	( 9,F)
Barry W.	(10,M)	Ronnie M.	(12,M)	Grace G.	(12,F)
Kevin G.	(13,M)	Marvin P.	(13,M)	Keith K.	(14,M)
Kevin J.	( 8,M)	Michael S.	( 9,M)	Barry E.	(13,M)
Susie B.	(10,F)	Bradley P.	(16,M)	Ricky E.	(13,M)
Nina C.	(15,F)	Jerry K.	(10,M)	Geoffrey B.	(14,M)
Diane R.	(13,F)	Lori D.	(13,F)	Bernice D.	(16,F)



Table III - 8. Distribution of Subjects by Age When Institutionalized

Age	Group A	Group B	Group C	Total
0 - 3 years	2	2	2	6
4 - 6 years	4	2	4	10
7 years and over	4	6	4	14
Total	10	10	10	30



the children were already involved in sense training and recreation activities at various times during the day, and it was decided to try to schedule the language training sessions so as to interfere with these other activities as little as possible. Beyond that, the pairs were formed so as to avoid obvious personality clashes and to encourage congeniality. The final arrangement is shown in Table III - 7.

It had been hoped originally to screen all of the children for hearing losses prior to admitting them to the study. In practice it was not possible to do this. Seven of the thirty children had had audiological examinations in the year prior to the study. The rest were examined after the study had begun. The results are summarized in Table III - 9. Testing was done in each case by trained audiologists. Equipment used included a Beltone Model 12D audiometer, a Zenith Model ZA 112A, and a Maico Model MA 24. The "untestable" children were Francis and Kevin in Group A, Ronnie and Marvin in Group B, and Jane in Group C. In most instances they refused to co-operate in testing each time testing was attempted in spite of the best efforts of the audiologist. In one instance the child was frightened of the earphones. The audiologist's subjective impression was that in every case except one (Ronnie) the children responded well enough to normal speech that serious hearing losses seemed doubtful.



Table III - 9. Summary of Hearing Examination Results

Hearing Level	Group			Total
	A	B	C	
Normal hearing	6	6	7	19
Mild loss (20 - 40 db)	2	2	2	6
Moderate or Greater loss	0	0	0	0
Untestable	2	2	1	5



### C. Measuring Instruments

A variety of methods have been suggested for assessing maturity of children's language. Some of these have focused on the extent of knowledge of word meanings, while others have focused on grammatical maturity. Tests of "recognition vocabulary" and of ability to imitate sentences have been used to assess children's language "competence". Also, samples of children's free linguistic expression have been used in attempts to assess language maturity. In the present study, measurements of several types were taken. A measure of receptive vocabulary and an imitation test involving phrases and sentences of increasing grammatical complexity were used to get at maturity of competence. Tape recorded language samples were used to assess maturity of performance, with particular attention being paid to fluency, length of utterance, variety of vocabulary used, and maturity of grammatical structures. Each of these is described in greater detail below.

#### 1. Tests

##### (a) The Peabody Picture Vocabulary Test (PPVT)

The Peabody Picture Vocabulary Test (PPVT) is said by its author "to provide an estimate of a subjects' verbal intelligence through measuring his hearing vocabulary" (Dunn, 1965, p. 25). It is an untimed, individual test consisting of three practice and 150 test plates, each with four numbered pictures. The test has two equivalent forms, Form A and Form B. In the present study, Form A was used in pre-testing and Form B in post-testing. The examiner reads the stimulus word, and the subject responds by pointing to the picture best illustrating the word.



In the present study the test was administered by members of the A.S.H. psychology department who were experienced in the administration of the test.

There are several features of the PPVT rendering it particularly suitable for use with mentally retarded children with limited communication skills. The test does not require the subjects to read or even make any oral responses. Subjects must simply be able to listen to words, see the drawings, and indicate their choices of response in some manner understood by the examiner. It is designed for use with subjects between the ages of 2 years 6 months and 18 years. In the present study, the children's chronological ages were within this range. PPVT raw scores were converted into mental age scores for the study.

#### (b) The Imitation Test (IT)

Although spontaneous utterances of children have provided much data for the analysis of children's language in studies of the growth of language competence (e.g. Weir, 1962; Brown, 1968) there are limitations inherent in that technique for use in the present study. Not all children are spontaneous or fluent in the language sampling interview. In addition, there is no assurance that the child's performance during the language-sampling interview indicates his total language competence. It has been argued (Menyuk, 1969) that the child's competence exceeds his everyday production, and that the child may well have acquired linguistic structures in his competence which have not yet found their way into his performance on any consistent basis. It is further argued (Fraser *et al* 1963) that the child's ability to imitate sentences longer than the span of immediate memory is influenced by the child's linguistic competence. When asked to repeat such a



"supraspan" sentence, the child's attempt at imitation will reflect the linguistic structures that he has in his competence and he may modify the sentence to conform to those structures. Fraser *et al* (1963) found that children regularly imitated more complex sentences than they produced spontaneously, and confirming results were obtained by Lovell and Dixon (1967). Osser *et al* (1969) feels that such evidence suggests that imitated utterances are closer to the "growing edge" of competence than are spontaneous utterances. An imitation test, then, may be useful in assessing the child's level of linguistic competence.

In the present study, a 27-item Imitation Test (IT) based largely on the work of Clay (1971) was used as a measure of competence. Details of its construction are included in Appendix A. The test was administered by members of the A.S.H. psychology department following the administration of the PPVT.

## 2. Language Samples

### (a) Language Sampling Procedures

The language sampling technique used in the present study was patterned closely after the procedures recommended by Lee (1974). As she points out, getting language samples from normally developing children is relatively simple, inasmuch as they are generally active and talkative. Weir (1962) simply placed a tape recorder in her son's bedroom at bedtime. Brown and his colleagues (Brown and Bellugi, 1964) collected samples in the child's home while he was at play in familiar surroundings.

With retarded and linguistically delayed children the situation is different. If a tape-recorder were placed next to a nonverbal child,



even for long periods, many tapes would remain blank. Hence some form of intervention is necessary if a useful language sample is to be garnered in a reasonable length of time. Lee (1974) feels that language samples taken in a clinical setting in a specially designed interview should be considered as "representative of the child's speech in conversation with an interested, responsive, minimally directive adult". In the present study, each child was engaged in a language-sampling interview with such an adult prior to and again following the language-training program.

Lee (1974) suggests that it is not necessary to go into the child's home to take a language sample or, in this instance, to go onto the wards of the institution. Instead, a small room can be equipped with recording equipment and suitable play materials and each child be brought in turn to the testing room. In the present study, two rooms on the lower floor of the Training Centre building at Alberta School Hospital were made available for the purpose. They were small rooms, approximately 12 feet by 12 feet, adjacent to the three rooms which were used in the language training program. Tape recording equipment in each room consisted of a Sony Tape recorder, model TC-80L, placed in a fixed position near the interviewer and child, and operated on 110 volt current.

#### (b) The Examiners

Language samples were taken by two nursing students from Red Deer College who were hired for the purpose. Each held a bachelor's degree, one in arts and the other in science, before entering the College's nursing program. Each of them had had previous experience with mentally retarded children, one as a ward staff at A.S.H./Deerhome



during the previous summer, and the other as a volunteer aide at the Parkland School for Retarded Children in Red Deer. They were made available to the project through funds from two sources. Initially they worked as "interns" under a grant from the Department of Culture, Youth and Recreation. For the post-testing, research funds from the Department of Health and Social Development were available to pay for the language-sampling interviews.

#### (c) Training the Examiners

The examiners were given eight hours of training over a two-week period before beginning to take the initial language samples. Training consisted first of all of becoming familiar with Lee's language sampling method, the stimulus materials, and the recording equipment. Then, practice sessions were held using young mildly retarded children from the public school system and moderately retarded children from the Parkland School. In these practice sessions, tape-recordings of the interviews were taken and later analyzed to study the examiner's questioning techniques, levels of language used, manner of speaking with the children, *et cetera*.

#### (d) The Language Sampling Interviews

Initial language sampling interviews took place during the two weeks prior to the commencement of the training program. Final interviews took place in the two weeks immediately following the training program. In the language sampling interview, the child was presented with a variety of play materials. Following the guidelines set out by Lee (1974), a box of suitable materials was prepared for each testing room, containing the following items:

1. an inexpensive plastic "farm" set, consisting of a wide variety of barnyard animals, fences, and a barn.



2. a set of wooden building blocks.
3. several toy cars of the Corgi variety.
4. a plastic toy telephone.
5. a set of toy tin dishes and plastic knives, forks, and spoons.
6. a dozen picture cards from the primary level *Let's Begin* of the Pflaum *Dimensions of Personality* series and the set of large picture cards, *Social Development Teaching Pictures*, published by David C. Cook.
7. two books with colorful pictures of a wide variety of items and activities, *The World of Language Book M* and *Multiworlds*.
8. a flannel board and *Instructo* felt pictures for a children's story, *Little Red Riding Hood*, and a variety of other felt pictures of birds and animals.

The materials were generally presented in the above order, although there were instances in which the child would insist on starting with some more appealing item than the one selected by the examiner. In such cases, the examiner would still try to be sure that all of the materials were exposed. There were also a few instances, however, in which the child became so restless or difficult to manage that the interview had to be terminated before all of the items had been presented.

A period of one hour was set aside for each interview. In a few instances the interview lasted nearly the full hour. In most cases it was slightly less, with a mean interview length of 39 minutes for the pre-training interviews and 38.5 minutes for the posttraining interviews. A few of the interviews were considerably shorter, mainly because of problems of restlessness and inattentiveness and marked hyperactivity. The shortest one (8½ minutes) was with a boy who became very violent during the interview (see Table III - 10, below).

The examiners tried to elicit complete sentences and high-level grammatical forms from the children. Regarding the former, there is a distinct danger in working with uncommunicative children that the



Table III - 10. Length of Language Sampling Interviews in Minutes

Length	Group A		Group B		Group C		Total	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
0 - 9	1	0	0	0	0	0	1	0
10 - 19	0	0	1	1	1	0	2	1
20 - 29	1	1	2	2	1	1	4	4
30 - 39	1	3	4	4	2	3	7	10
40 - 49	5	6	2	3	2	5	9	14
50 - 59	2	0	1	0	4	1	7	1



examiner will fall into a pattern of questioning which invites one-word responses. "What color is the barn?", for instance, invites a one-word response rather than a sentence. "What happened?", on the other hand, is more likely to bring a complete sentence if the child is capable of formulating one. With regard to high-level grammatical forms, Lee recommends that the examiner use a variety of forms and not limit herself to simple present tense. If the child is not capable of replying with the same form as the clinician is using, he will use his own less mature forms instead. If he is capable, however, then he will be encouraged to do so by the examiner's model, and will in this way give his best in the language sample.

In the testing situation, the examiners generally repeated what the child said. It is often difficult to transcribe a conversation from a tape, since articulation is a problem with many retarded children. By repeating what she thought the child had said before making her own response, the accuracy of the transcription could be greatly increased. For example, if the child said, "I don't got any", the examiner might respond, "You don't got any? Here's one." Or again, if the child said, "It broke", the examiner might respond with "It broke? Yes, it is, isn't it." In such an instance, the examiner's repetition not only ensured that she would be able to hear the words more accurately on the tape but also reminded the examiner that in this case the child was using "broke" as an adjective rather than as the simple past tense of "break". Such a distinction might well be evident during the interview but very difficult to make later from the tape recording alone.

The examiner immediately made a long-hand transcription after each



language-sampling interview. It was essential that the transcription be made by the examiner, so that she would remember the child, the materials, and the conversational context. It was important, too, that the transcription be made as soon as possible after the recording session so that the examiner could make good use of her recall of the situation. Transcribing the tapes often proved to be a very laborious, painstaking procedure requiring that sections of the tape be played over several times to ensure accuracy of transcription.

In Lee's sampling technique, the child's language is written in words, not phonetic symbols. It is not necessary to record articulatory errors. Where the omission of a speech sound, however, interferes with grammatical rules it is important to record these accurately. For example, omission of the final /s/ will result in the loss of plurals and possessives. It is important to listen very closely to determine whether or not the /s/ is included.

In an attempt to evaluate the accuracy and reliability of the examiner's language samples, the investigator did spot checks of the interview procedures on eight occasions during the pretraining language-sampling interviews, and four occasions during the posttraining interviews. On these occasions, the investigator sat in the examining room with a second tape-recorder and made a running, written transcript of the interview proceedings for a 20-minute period. Although in a few instances the child insisted that the investigator become involved in the interview, for the most part he was able to sit unnoticed in a corner of the room. Immediately afterward, he made a written transcription of his own tape. This transcription was then compared with the examiner's transcription. A detailed comparison of the transcrip-



tions appears in Appendix B. The reliability coefficients of 0.88 or better indicate a high degree of reliability in the language sampling procedures.

In order to avoid examiner bias in favor of one group or another, it was important that the examiners be unaware of the treatment group to which each subject belonged. Some of the initial language samples were taken even before the subjects had been assigned to treatment groups, so that examiner objectivity was assured on the initial examination. Then the examiners had no part in the study until the training period was over. They remained strangers to the children, and had no way of knowing which children were in which treatment group, so that objectivity was assured for the final examination as well.

#### (e) Analysis of the Language Samples

The language sampling interviews produced for each child a corpus of spontaneous language which was then analyzed in several ways, each of which is described below. As a first step, it was necessary to go through each transcript in the manner described in Appendix C and remove from it those parts which could not be used, including echolalic utterances, transfer noises, recitations, counting, reading, and incomprehensible words.

The edited language samples were analyzed in four ways. First, vocabulary was evaluated by determining the Type Count (TC) and the Type-Token Ratio (TTR) for each sample. Second, fluency was estimated by the total number of words said per minute of time and the number of utterances per minute. Third, grammatical maturity was estimated by determining the Mean Length of Utterance (MLU). And fourth, syntactic complexity was assessed by applying Lee's (1974) Developmental Sentence



Analysis to each sample.

(i) Type Count (TC)

The Type Count is simply the number of different words used by the child in the language sample. Certain rules were employed concerning what to count (see Appendix D).

(ii) Type-Token Ratio (TTR)

Loban (1963) used the type-token ratio in his analysis of the language of kindergarten and other school children. Other investigators have used it in studies with retarded children (Spradlin and Rosenberg, 1964; Siegel, 1963). The type-token ratio (TTR) is simply the ratio of the number of different words used (types) to the total number of words used (token) in a sample of language.

(iii) Fluency

Fluency in the present study was taken to mean simply the amount of language used in a given interval of time. This was only one interpretation of fluency in Loban's (1963) study. Loban's fuller definition of fluency includes (1) the amount of language uttered; (2) the extent of the vocabulary; (3) freedom from mazes; and (4) a readiness-slowness to respond dimension. His study included measures of each of these aspects of fluency. In the present study, it is the first element (the amount of language uttered) that is measured.

Fluency is measured in two ways. First, following Loban, the total number of words in the transcript is used. The rules outlined in Appendix D regarding TC were applied here as well, so that incomprehensible words were excluded as well as words in several other categories, such as counting and recitations. In order to make allowances for the fact that the language sampling interviews differed in length, the



total number of words used was divided by the number of minutes in the interview, yielding a fluency measure of number-of-words per minute.

As a second measure of fluency, the number of utterances in the transcript was counted. Again, in order to make the scores comparable in spite of the differing lengths of the interviews, a ratio was obtained of the number of utterances per minutes of interview time. In the section to follow concerning Mean Length of Utterance, reference is made to several rules concerning which utterances are to be counted. As a measure of fluency, the total number of countable or acceptable utterances in the interview was divided by the total number of minutes in the interview.

#### (iv) Mean Length of Utterance (MLU)

Brown (1973) provides explicit rules for determining mean length of utterance (MLU). In the present study, Brown's rules were followed in large measure, but there were exceptions. First, Brown recommends using the first one hundred satisfactory utterances commencing on the second page of the transcript. Since the transcripts in the present study were generally not so lengthy as those which Brown used, this rule could not always have been followed. Here, the MLU was based on the middle hundred utterances if there were more than one hundred utterances available, or on the entire transcript if there were not.

Second, Brown is not clear about whether to count "yes" and "no" in an expression such as "Yes, I do" as part of the total three-word utterance, or to separate it and count the expression as one one-word utterance, "yes", and one two-word utterance, "I do". In this instance, Lee (1974) provided some guidance. Lee says that, since the interjection ("yes", "no", "okay", "bye-bye", *et cetera*.) is not an integral part of



the grammatical structure, it should be separated from the utterance and classified by itself.

The transcripts had already been edited to rule out certain words (see the section on TC). Now they were edited to rule out certain utterances, using the eleven rules presented in Appendix E. Each transcript was divided into utterances in accordance with these rules, and the number of morphemes in each utterance counted. It was then possible to count the total number of utterances (used in one of the measures of fluency), the total number of morphemes, and hence the average number of morphemes per utterance, or mean length of utterance (MLU).

#### (v) Developmental Sentence Analysis

Developmental sentence analysis is a technique for evaluating children's syntactic maturity developed by Lee (Lee and Canter, 1974; Lee, 1974) for use by speech and language clinicians. It is described by Lee as "a method for making a detailed, readily quantified and scored evaluation of a child's use of standard English grammatical rules from a tape-recorded sample of his spontaneous speech in conversation with an adult". (p. xix). The language samples were next analyzed according to Lee's DSA procedures.

Lee recommends two different analysis operations, depending upon the degree of syntactic maturity displayed in the language sample. Developmental Sentence Scoring (DSS) is appropriate if the corpus selected for analysis includes fifty complete sentences. A sentence is judged complete if it has a noun and verb in subject-predicate relationship. Thus some two-word combinations, including some two-word "wh" questions, would qualify as sentences because the two words are in a subject--predicate relationship (e.g. "Doggie bark" and "What happen?").



Some imperative sentences consisting of just single verbs also qualify, since the omission of the subject is allowed in imperative sentences (e.g. "Look!" or even "Don't").

If the corpus does not contain fifty "complete sentences", then the appropriate system of analysis is Developmental Sentence Types (DST), which is intended as a classification system for what Lee refers to as "pre-sentences". These are utterances which contain only partial subject-verb grammatical structure. Spoken words and word combinations that do not contain both subject and verb are called pre-sentences. For these utterances, Lee's method provides for a qualitative analysis of the grammatical structure inherent in the child's language sample, but not a quantitative analysis. It does not yield a score.

Lee gives instructions for selecting a corpus of a child's utterances for analysis, as well as instructions for both DST and DSS analyses. A summary of these instructions appears in Appendix F. Following these fifteen basic instructions, each transcript was examined and the different utterances identified. Although Lee recommends that DSS analysis be undertaken only if there are fifty or more complete sentences, in the present study the DSS analysis was employed whenever the transcript contained a minimum of ten complete sentences. It was found that very few transcripts had fifty complete sentences, but most had ten or more. There is a danger in basing a DSS score on too few sentences. A child using only one or two sentences may be using rather mature forms learned by rote with little or no generative power. His average score, in such a case, would be unrealistically high. It was felt, however, that a minimum of ten sentences would be sufficient to avoid this danger. In the initial language samples, four children in Group A used ten or more



complete sentences; seven in Group B; and eight in Group C. In the final language samples, the numbers of subjects using ten or more complete sentences in each group were eight, six, and eight respectively.

Transcripts in which less than half of the utterances were complete sentences were set aside for DST analysis, including a few which had been used for DSS analysis. There were twenty-two of the initial language samples analysed by DST analysis (eight from Group A, eight from Group B, and six from Group C) and twenty-two of the final language samples (seven from Group A, eight from Group B, and seven from Group C). Although Lee recommends that the DST analysis be based on one hundred different utterances, in the present study it was based on as many different utterances as were available, up to one hundred.

#### D. The Language Training Techniques

##### 1. Selecting the Language Trainers

Language trainers for the study were regular employees of Alberta School Hospital, seconded to the project by the Director of Rehabilitation. Two of them worked on the wards (Pine Villa) as attendants, while the third was a member of the psychology department. The Director of Rehabilitation had familiarized the department heads with the project and they in turn had spoken to several employees who, they felt, would be interested in the project and capable of working in it. Later, a meeting was held with these several employees and the department heads at which the author explained the language-training project in detail. The three language trainers then decided that they would participate in the project.

None of the language trainers had any special background of



knowledge in the area of language development. They had varied academic backgrounds. One had a B.A. degree with a major in psychology, and had worked at Alberta School Hospital in the psychology department for over five years. Most of that time she had worked on a special unit for emotionally disturbed children and only recently had become involved in self-help training programs with severely and profoundly retarded children. The second trainer was a graduate of a two-year diploma program in rehabilitation counselling in Ontario, and had worked in provincial institutions for the retarded in Ontario before coming to Alberta School Hospital. At A.S.H. she worked as a ward attendant on Pine Villa. The third trainer held a high school diploma and had no further academic training. She was employed as an institutional aide, working on Pine Villa at A.S.H. where she had been employed for two years since leaving high school. All of them had a strong interest in the development of retarded children, and all demonstrated a good ability to establish rapport with the children. They also had the advantage of experience in working with children whose behavior is sometimes difficult to manage, so that they were not unduly upset by tantrums, pouting, and occasional violent outbursts.

## 2. Training the Language Trainers

Training for the language trainers took place in five half-days during the two-week period, April 7th to April 18th. Training required approximately twelve hours in all. The first training session was devoted to providing the trainers with the details of the study and theory upon which it was based. They were given short selected readings from McNeill, from Bellugi and Brown and others which were intended to



make them familiar with the nature of expansion modelling and expatiation modelling. Practice sessions were held using sections of written transcripts of language-sampling interviews. In this paper-practice, the trainers would read a child-utterance as an "expansion" trainer, as an "expatiation" trainer, or as a "no-treatment" trainer. When each trainer had decided upon her probable responses, these were compared and discussed and modified where appropriate.

At the third training session, the language trainers were made familiar with the proposed lesson materials, the sequence of lesson themes, and the approach that they would be expected to use in presenting the materials. At this point, the lesson themes and materials had not been entirely finalized, and the language trainers were asked to comment on the suitability of various items. They questioned, for example, the suitability of using live small animals, which had been proposed for several of the lessons. They felt that at least a few of the children might mistreat kittens or puppies, and a few others might be quite frightened by them. Their comments were taken into consideration and the lessons modified in some instances. In regard to the example mentioned, it was decided not to discard the live animal lessons at least until the trainers had had an opportunity to get to know the children in the study, and to discard the lessons later if trainers still had the same concerns. In the end, the small animal lessons stayed and the children enjoyed puppies, kittens, chicks and ducklings.

The remaining training sessions were given over to practice sessions with four children at Alberta School Hospital, using one of the rooms that was to be used as a training room in the project. The language trainers took turns working with a child while the other two trainers



and the investigator observed. The practice sessions were recorded on audiotape. Following a period of interaction, the group would listen to the audiotape and critically evaluate the trainer's responses. In this manner, each trainer acquired skill in working in each treatment situation, viz. expansion modelling, expatiation modelling, and no consistent modelling.

On three occasions during the project, videotapes were made of the language lessons. Three students from a media-science class in the public school system did the videotaping, using Sony portapak equipment. The students were experienced in the use of the equipment. They were familiar with the general nature of the project, but did not know any of the subjects and did not know which training groups the children belonged to. They were instructed simply to get on tape as much of the verbal interaction as possible. Taping was scheduled so that lessons were recorded in each third of the project (on days 8, 21 and 40), and so that each trainer was taped working in each of the three training groups. Although the trainers knew from the beginning of the study that videotapes would be made, they did not have advance notice of the specific days. The tapes provided feedback for the trainers. A day or two following the videotaping sessions, the trainers met as a group with the author to study the videotapes and evaluate their own performances. This helped them to maintain and increase their skills in each treatment method. In addition, the trainers met once a week at lunch for a group discussion of the progress of the project and problems they might be encountering.

### 3. Assignment of Trainers to Treatment Groups

It was important that each trainer should be competent in each mode



of treatment, since the experimental design called for random assignment to treatment groups, day-by-day. That is, although the ten children in a group remained in that group, using the same treatment room, for the whole ten weeks of the study, the language trainers were assigned to a treatment group daily on a random basis. This was done in order to eliminate the possible effects of trainer personality. If each trainer had stayed with the same treatment group throughout the study, uncontrollable personality variables may well have affected the results in an unknown manner and to an unknown degree. To avoid this, each trainer worked with each group for one-third of the sessions, being assigned at random on a daily basis. The trainers did not know until the morning, or possibly the evening before, which group they would be working with for the day. Therefore, it was necessary for them to feel quite familiar with each method and to be able to switch from one to the other with relative ease.

The number of hours spent by each trainer with each group is shown in Table III - 11, below.

The actual day-by-day assignment of each trainer is given in Appendix G.

#### 4. Attendance Rates at Training Sessions

Although the plan called for 44 language-training sessions for each child, it was expected that there would be occasional absences. In an institution the size of Alberta School Hospital, there can be occasional breakdowns in communication with the result that some children miss a lesson or two. In addition, there were bound to be illnesses, trips to the dentist, temper tantrums, epileptic seizures, and so on, all of which necessitated absence from the language training program.



Table III - 11. Number of hours spent with each training group

Trainer	Treatment	Treatment	Treatment
	Group A	Group B	Group C
Carol	7 hours	7½ hours	7 hours
Linda	7 hours	7 hours	8 hours
Penny	8 hours	7½ hours	7 hours



In fact, the children's attendance ranged from a low of 28 sessions (14 hours) to a high of 44 (22 hours), with an average attendance of 38.4 session (19.2 hours). Attendance by groups is shown in Table III - 12 below.

#### E. The Instructional Program

Language training sessions took place in three rooms on the lower floor of the Training Centre building at Alberta School Hospital. These rooms were set aside for the exclusive use of the project for the required ten-week period. The rooms were approximately 12 ft. by 12 ft. and had some cupboard space, a sink with hot and cold water, a full length mirror, and a window to the yard outside. Access was from a corridor connecting all of the rooms on the lower floor. A full-length window in each entry door allowed observation from the corridor. Only one of the rooms could be observed from an adjacent room through a one-way glass, and this was seldom used.

Since the most important part of the language-training program was the modelling provided by the language trainers in response to the children's utterances, it was extremely important that the children be provided with activities that would capture their interest and invite them to talk. Several problems seemed evident. First, because of their mental retardation, the children would not understand or be interested in activities that would appeal to "normal" children of comparable chronological ages. The appeal would have to be to comparable mental ages. Second, the children in the study ranged in chronological age from eight to sixteen years and showed fairly wide differences in functional level. The activities chosen would have to appeal in some



Table III - 12. Distribution of Subjects by Actual Number of Hours of Language Training Received

Hours	Group A	Group B	Group C	Total
22.0 and 22.5	0	0	1	1
21.0 and 21.5	1	4	1	6
20.0 and 20.5	2	3	1	6
19.0 and 19.5	3	1	3	7
18.0 and 18.5	3	1	3	7
17.0 and 17.5	0	0	0	0
16.0 and 16.5	0	0	1	1
15.0 and 15.5	1	0	0	1
14.0 and 14.5	0	1	0	1
Mean Number of Hours	18.85	19.60	19.15	19.20



way or another to this variety of levels and interests. Third, some activities may tend to be so demanding or so engrossing (e.g. some fine motor tasks) that they would inhibit rather than encourage language. These would have to be avoided.

According to Piaget (Baldwin, 1967) four major developmental stages can be identified in the development of children's thinking. Stage 1, "sensorimotor intelligence", occupies the first two years of life in the normal child. Stage 2, "preoperational thought", occupies the next five years. Between the ages of seven and eleven years the normal child passes through the stage of concrete operations, stage 3, and then finally enters the fourth stage, "formal operations". Woodward (1959, 1962) has argued that this developmental sequence is applicable to retarded children as well, but that the ages at which the various stages are entered is markedly delayed. It is currently believed (Whyte, 1975) that for moderately and severely retarded individuals ("trainables") the potential for development ceases at the preoperational stage. Whyte sees these children completing stage 1 and entering stage 2 at around eleven years of age. This would suggest that the children in the present study would be developmentally in the late sensorimotor and early preoperational stage. This in turn suggests that activities usually found to be interesting to children in nursery schools and kindergartens should be interesting to the children in the study. Suitable activities might include the following: making objects fit into containers (trucks, wagons, blocks, *et cetera.*); sequencing activities; sorting and matching activities; imitation and make-believe; painting and coloring; activities which develop fine-muscle co-ordination (cutting, pasting, *et cetera.*).



Several themes were identified which are frequently interesting to nursery school and kindergarten children: farms and farm animals, self-awareness, communication, weather, food, household activities, transportation, pets and small animals. Around each of these, a number of specific activities were developed, each of which could provide the major activity for a half-hour language-training session. It was hoped that, in each case, the activity would interest the children, and would stimulate them to talk. A sequential list of activities for the 44 days of the study appears in Appendix H.

In the nine weeks of the language-training project, there were 44 language-training sessions or "lessons" (one day was lost because of the May 24th holiday). It was decided to try to present four new activities each week, and on the fifth day to allow the children to choose their own activities from the variety of materials present. For the most part, each new activity and set of materials became a permanent part of the language training room so that, as the project progressed, the training room environment became progressively richer. On each day that a new activity was introduced, the children were encouraged to become involved with that activity, at least for a few minutes. Then, if it did not hold their interest, they could seek out something else in the room with which they were already familiar.

For the most part, the "lessons" were described only briefly to the language trainers, with an indication of the materials on hand during the lessons, the nature of the object to be made if something was to be constructed, and instructions telling how to make it. For example, on Day 8 the activity was "dressing up". The following brief instructions were given to each language trainer:



Each room will have a big carton with some old clothes for dressing up. These can stay in the room from now on and be part of the available play materials. Let the youngsters dress up as they please, put on the wigs, etc., and talk about who they're being. Use the mirror so they can look at themselves and talk about what they see.

Again, on Day 16, the theme was "kitchens and food". Language trainers received the following instructions:

The theme for a day or two is kitchens and food. Today the activity is to make a stove. There's a large carton provided, with an oven door cut into it. Also a wooden knob with a screw, to make a handle for the stove. You have tempera paints and felt markers available, so use them to make the burners, paint the stove, or whatever suits you and the kids.

Each morning the instructions were delivered to the trainers, together with an indication of the treatment groups they were to work with and all of the necessary equipment and materials.

Although the written instructions to the language trainers were brief, regular discussions with the trainers permitted some elaboration of the teaching possibilities inherent in each lesson. For example, the theme "kitchens and food" (e.g. lesson 16, above) offered opportunities to present or develop a number of important concepts: the categorization of things that belong in kitchens or on tables or in grocery stores; the properties of stoves and ovens; the relationship of stoves and cooking to food; the relationship of control knobs to heating elements; and other concepts such as these were dealt with at luncheon meetings and in other discussions with the trainers. The actual interaction and language modelling, if any, was left to the discretion of the language trainer, to be determined by the technique appropriate to the group she was working with and by the children's utterances.



## CHAPTER IV

### RESULTS AND DISCUSSION

#### A. Findings

Findings in the present study are of two types: findings derived from the analysis of the test results, and other findings derived from observations made during the training program. The present section deals first with the test results and then with the other observations. In the statistical analysis, post-test results were subjected to a two-way analysis of variance as a first step. Next, pre-test and post-test means for each group on each measure were compared. Then, correlation coefficients were computed amongst the pretreatment and posttreatment scores on the language measures. In addition to these statistical analyses, Developmental Sentence Types analyses were carried out on the presentence utterances of those children whose language samples yielded very few complete sentences. In addition, videotaped language lessons were analysed to estimate the degree of success experienced by the language trainers in working with each of the three treatment methods. Finally, some observations were made concerning the suitability and acceptability of the training activities and materials.

#### 1. Analysis of Variance

Posttreatment test scores were subjected to a two-way analysis of variance, with two rows and three columns. Subjects were classified into row one or row two on the basis of "high" or "low" performance on the pretreatment administration of the measure being analyzed, with "high" being defined as above the median for the total group of thirty subjects. They were assigned to columns one, two and three on the basis



of treatment group A, B, and C. This analysis was undertaken in order to look for significant differences between group posttreatment means, and for any possible interaction between treatment and initial test performance.

Table IV - 1 gives the weighted column means for each language measure, and the probability values for the differences obtained. Only one of the differences, Number of Sentences was significant at the .05 level of confidence. Group A subjects used significantly more complete sentences in the final language-sampling interview than did subjects in either of the other groups. Null hypotheses 6(a) and 6(b) can therefore be rejected. We can conclude that expansion modelling in the present study led to greater use of "complete" sentences than did either expatiation modelling (Group B) or no consistent modelling (Group C). Table IV - 1 also shows the F ratios and probability values for the row effects. Significants were assigned to rows on the basis of initial language measures as being either "high" or "low" language users. Not surprisingly, most of these inter-row differences were statistically significant.

The same two-way analysis of variance failed to reveal any significant interaction between "high" and "low" groups (based on initial scores on the measures used) and type of treatment received. That is, there is no evidence that any of the treatment conditions was particularly effective for either high pre-test groups or low pre-test groups as determined by initial test scores. Mean final scores for high and low groups on each of the nine measures are shown in bar graph form in Figure IV - 1.



Table IV - 1. Weighted Column Means and Probability Values for Post-Treatment Scores on Nine Language Measures

Measure	X <sub>A</sub>	X <sub>B</sub>	X <sub>C</sub>	Row Effect (High-Low Language) F P	Column (Effect Groups) F P	Interaction Effect F P
Type Count	139.50	124.29	106.81	18.37 <0.00**	0.64 0.54	1.07 0.36
Type Token Ratio	0.30	0.38	0.31	3.79 <0.06	2.22 0.13	1.47 0.24
Utterances per Minute	6.34	5.73	4.65	17.21 <0.00**	0.87 0.43	0.20 0.82
Words per Minute	11.12	10.09	8.42	20.82 <0.00**	0.51 0.61	0.03 0.97
Mean Length of Utterance	1.92	1.83	2.07	18.42 <0.00**	0.50 0.61	0.30 0.74
Number of Sentences	49.75	27.21	25.75	31.64 <0.00**	3.78 0.04*	1.45 0.26
Developmental Sentence Score	343.83	351.88	360.75	0.61 <0.45	0.07 0.94	2.13 0.16
Peabody Picture Vocabulary Test	37.13	36.20	47.21	17.15 <0.00**	2.72 0.09	0.67 0.52
Imitation Test	37.03	54.36	54.39	21.46 0.00**	2.04 0.16	1.69 0.21

\*Significant at the .05 level.

\*\*Significant at the .01 level.



Figure IV - 1. Post-treatment Mean Scores of High and Low Performers on Nine Language Measures

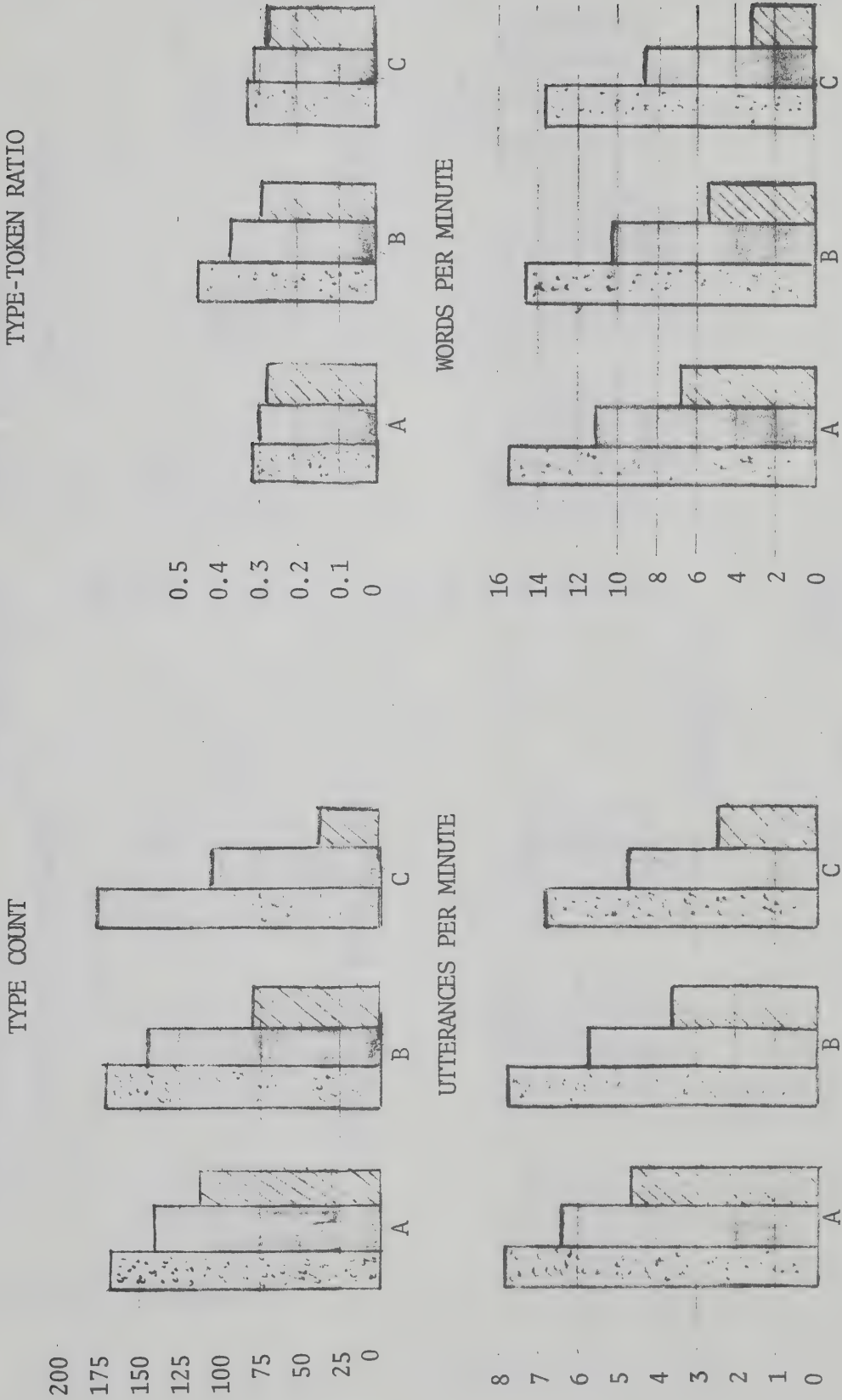




Figure IV - 1. Post-treatment Mean Scores of High and Low Performers on Nine Language Measures

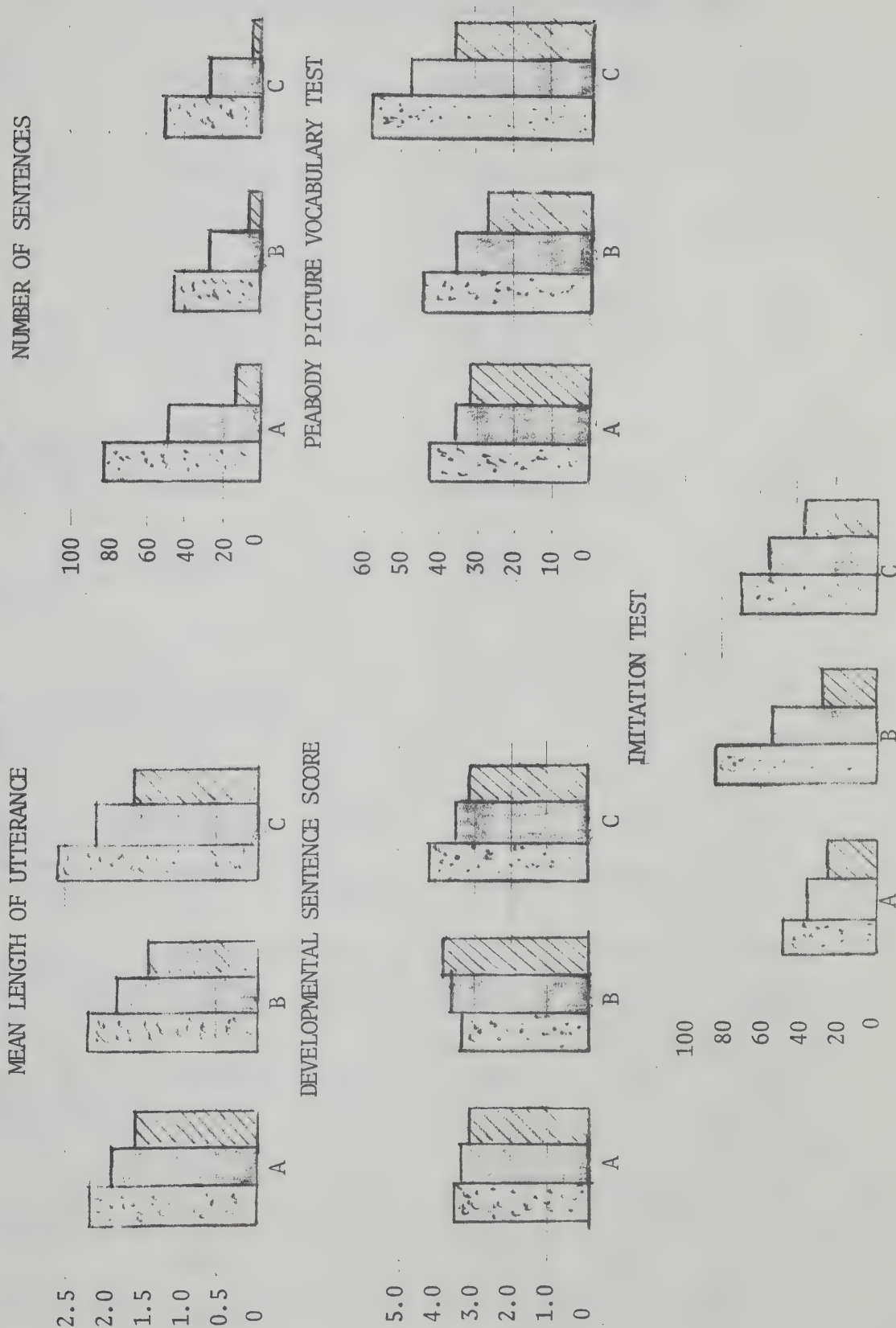




Table IV - 2. Post-Test Mean Scores on Nine Language Measures, by Etiological Classification and by Treatment Group

Measure	Etiology	Group A	Group B	Group C	Weighted Row Mean
Type Count	Mongoloid	158.60	97.00	142.60	132.73
	Other	76.80	116.50	146.00	113.10
Type-Token Ratio	Mongoloid	0.31	0.4	0.23	0.33
	Other	0.30	0.30	0.33	0.31
Utterances per Minute	Mongoloid	7.40	4.65	6.28	6.11
	Other	4.63	6.26	5.15	5.35
Words per Minute	Mongoloid	13.60	6.21	11.51	10.44
	Other	6.82	11.47	10.82	9.70
Mean Length of Utterance	Mongoloid	2.04	1.74	1.90	1.90
	Other	1.66	1.98	2.14	1.92
Number of Sentences	Mongoloid	44.80	16.17	48.80	36.59
	Other	24.60	34.50	29.40	29.50
Developmental Sentence Scores	Mongoloid	323.67	361.67	349.75	345.03
	Other	364.00	322.67	371.75	352.81
Peabody Picture Vocabulary Test	Mongoloid	38.40	38.67	44.00	40.36
	Other	29.60	32.50	45.60	35.90
Imitation Test	Mongoloid	46.60	44.17	56.00	48.92
	Other	21.50	41.00	58.80	40.43



Final language scores were subjected to a second two-way analysis of variance, using two rows based on etiological classification ("Down's Syndrome" and "Other") and three columns (treatment groups A, B, and C). This was done in order to determine whether or not any of the treatments affected mongoloids and non-mongoloids in a significantly different manner. The mean scores for each etiological classification and each treatment group are given in Table IV - 2, as well as the weighted row means. None of the differences was statistically significant.

## 2. The Correlation Matrix

Product-moment correlation coefficients were computed for a matrix of sixteen variables, viz. pretreatment test scores on eight language measures and posttreatment scores on the same eight measures. These correlation coefficients are given in Table IV - 3. It will be noted that most of the correlations are significant at the .05 level. The most notable exception is Type Token Ratio, which correlated poorly with all other measures.

## 3. Developmental Sentence Types

Lee (1974) describes two methods for analyzing children's language samples. The Developmental Sentence Score (DSS) analysis is intended for use with language samples in which fifty per cent or more of the utterances achieve the status of complete sentences. The Developmental Sentence Types (DST) analysis is meant for samples containing less than fifty per cent complete sentences. In the present study, twenty-two



Table IV - 3. Correlation Coefficients for Eight Pretreatment Tests and Eight Posttreatment Tests

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. PPVT (pre)	1.000	0.640*	0.390*	0.339	0.279	0.251	0.522*	0.348	0.848*	0.702*	0.567*	0.136	0.351	0.264	0.586*	0.303*
2. IT (pre)		1.000	0.702*	0.124	0.486*	0.404*	0.689*	0.607*	0.618*	0.936*	0.644*	-.055	0.599*	0.336	0.768*	0.635*
3. TC (pre)			1.000	-.148	0.700*	0.693*	0.640*	0.755*	0.570*	0.741*	0.827*	-.119	0.787*	0.668*	0.633*	0.673*
4. TTR (pre)				1.000	-.280	-.269	0.057	-.246	0.224	0.189	0.119	0.693*	-.094	-.048	0.150	-.167
5. KPM (pre)					1.000	0.885*	0.772*	0.875*	0.292	0.578*	0.551*	-.224	0.725*	0.520*	0.651*	0.717*
6. UPM (pre)						1.000	0.580*	0.691*	0.246	0.541*	0.590*	-.133	0.630*	0.672*	0.447*	0.556*
7. MJU (pre)							1.000	0.819*	0.465*	0.697*	-.533*	-.053	0.727*	0.461*	0.882*	0.753*
8. NS (pre)								1.000	0.347	0.636*	0.565*	-.229	0.792*	0.451*	0.748*	0.883*
9. PPVT (post)									1.000	0.657*	0.611*	0.021	0.383*	0.307	0.510*	0.335
10. IT (post)										1.000	0.724*	0.039	0.625*	0.446*	0.754*	0.624*
11. TC (post)											1.000	-.049	0.834*	0.746*	0.641*	-.666*
12. TTR (post)												1.000	-.301	-.210	0.045	-.283
13. KPM (post)													1.000	0.745*	0.745*	0.882*
14. UPM (post)														1.000	0.366*	0.507*
15. MJU (post)															1.000	0.794*
16. NS (post)																1.000

\*Significant at the .05 level.



Figure IV - 2. DST Analysis: Proportion of One-word, Two-word, and Construction Responses in Initial and Final Language samples.

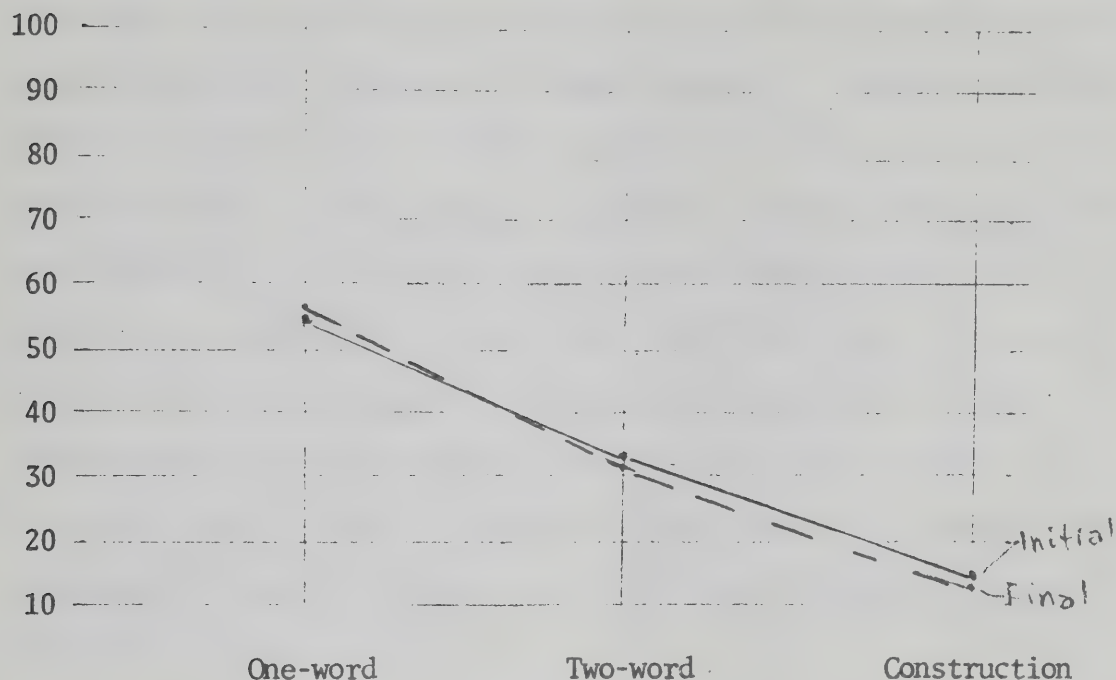
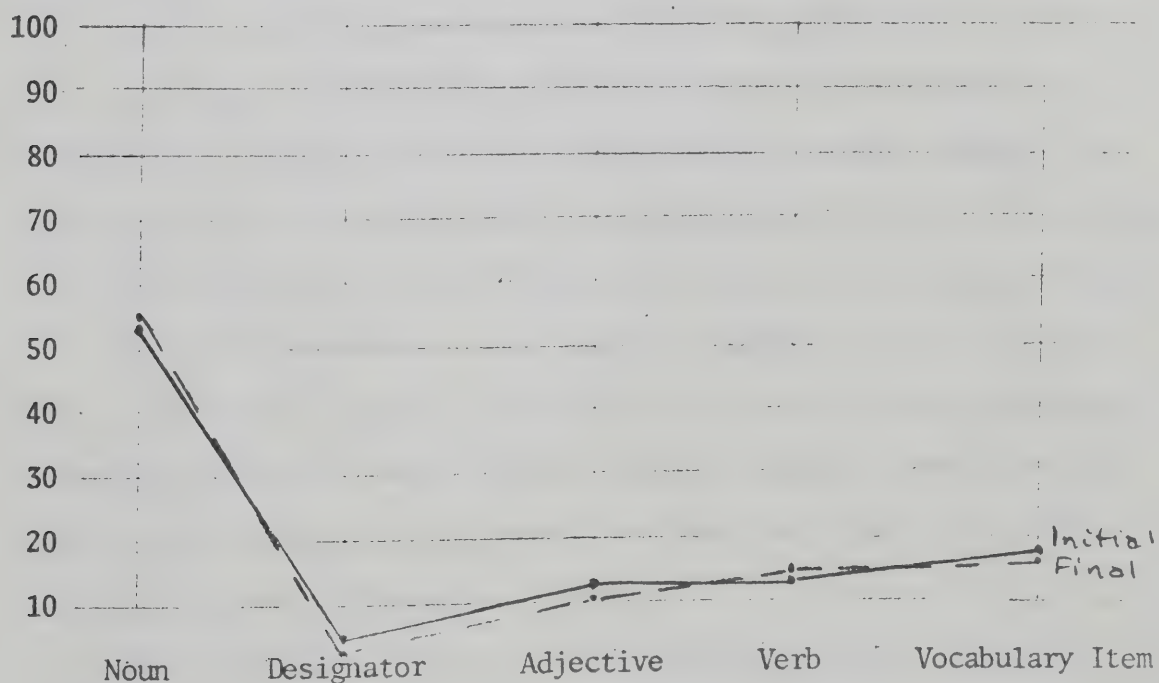


Figure IV - 3. DST Analysis: Proportion of Utterances in Each Category of Presentence Type, on Initial and Final Language samples.





initial and twenty-two final language samples were subjected to D.S.T. analysis. This procedure yielded some descriptive information about the early, presentence language of retarded subjects. The means for these twenty-two subjects are charted in Figures IV - 1 and IV - 2. Initial and final means are very similar. Although in some of these instances the individual's DST pattern varied markedly from the group pattern, there was no common type of variation. Each individual's DST pattern seems to be different from the others. The DST analysis yields a description of the individual's language which could be useful to a clinician, but it failed to reveal any common pattern of language usage that might be said to accompany or predict rapid growth in the use of complete sentences.

#### 4. Language Trainer Performance

On three occasions during the project, videotapes were made of language lessons (see page 64, above). The videotapes provided data for comparing the language behavior of the language trainers in the three treatment conditions to see whether or not they performed in a significantly different manner from one training group to another. In addition, each trainer kept a daily log with comments about the children, the lessons and her own effectiveness that day with the treatment method.

The daily logs make it clear that the language trainers did not feel that they were equally competent in all three treatment conditions. Following each lesson, each trainer rated her success in utilizing the method on a five-point scale, with 1 as "good" and 5 as "poor". The results are shown in Table IV - 4 below.

It is clear from Table IV - 4 that all three trainers found "no-treatment" to be easiest, while expatiation gave them the greatest



Table IV - 4. Language Trainers' Ratings of Their Degree of Success in Implementing Treatment Procedures, Expressed as Percentage of Total Ratings

		1+2	1 (Good)	2	3	4	5 (Poor)	4+5
Expansion	Linda	61.8	19.1	42.7	33.8	4.4	0	4.4
	Penny	77.2	43.9	33.3	10.5	10.5	1.8	12.3
	Carol	56.5	1.4	55.1	43.5	0	0	0
	Total	64.4	20.1	44.3	30.4	4.6	0.6	5.2
Expatriation	Linda	29.9	4.5	25.4	46.3	17.9	5.9	23.8
	Penny	1.9	0	1.9	15.4	26.5	46.2	82.7
	Carol	36.1	0	36.1	52.8	11.1	0	11.1
	Total	24.6	1.6	23.0	40.3	20.4	14.7	35.1
No-treatment Control	Linda	94.7	36.0	58.7	5.3	0	0	0
	Penny	88.9	66.7	22.2	6.7	2.2	2.2	4.4
	Carol	80.0	16.9	63.1	20.0	0	0	0
	Total	88.2	36.8	51.4	10.8	0.5	0.5	1.0



difficulty. Only 24.6 per cent of their ratings were positive for expatiation as compared with 64.4 per cent for expansion. On the other hand 35.1 per cent of the expatiation ratings were negative as compared with only 5.2 per cent negative ratings for expansion. Although there were substantial differences amongst trainers in the degree of success they perceived in their performances, the pattern is the same for each of the three trainers. The greatest proportion of positive ratings (from 80.0 to 94.7%) is for the no-treatment control condition. The next highest proportion (56.5 to 77.2%) is for the expansion condition. The fewest positive ratings of all are given to the expatiation condition (1.9 to 36.1%).

When the nine videotapes were examined in detail, it became clear that the language trainers did indeed respond in a different manner in each treatment group. They expanded much more frequently in Group A, expatiated much more in Group B, and avoided both types of models quite successfully in Group C. In order to demonstrate this, a four-category classification system was used. Each of the trainers statements during the training session could be classified into one of four categories. First, there were expansions. Second, there were expatiations. A third category included "eliciting comments", i.e. questions and statements designed to elicit language from the children beyond a simple "yes" or "no". The fourth, or "other", category included remarks such as "please" and "thank you", repetition of the child's statement without any expansion, questions requiring a "yes" or "no" answer, and "controlling" statements intended to get the child to do some activity or to stop doing it (e.g. "Sit down here, Susie.")

Using this four-category classification system, each trainer-utterance in each transcript was categorized. As a check on the categorization, a second rater who had been instructed in the four-



category classification system also rated the same utterances independently. The ratings of the two judges over the nine interviews were then compared, and a reliability estimate obtained by the formula:

$$\text{Per cent of reliability} = \frac{A}{A + D} \times 100$$

where A is the number of agreements and D the number of disagreements. A percentage of 91.14 was obtained. Following the comparison, the two raters discussed the disagreements and agreed upon the best classification for each disputed response.

An analysis of the responses of each trainer in each of the three treatment conditions made it evident that the trainers had achieved a high degree of flexibility. They were indeed able to respond differentially from one treatment group to another. Looking first at expansions (Table IV - 5 below) we see that on the average nearly one-third of all responses in Treatment Group A were expansions, as compared with only 2.73 per cent in Group B and 0.63 per cent in Group C.

Looking next at expatiations (Table IV - 6 below), it is apparent that the trainers used many more expatiations with Group B (the "expatiation" group) than with either of the other groups. Again, nearly one-third of all trainer responses in Treatment Group B were expatiations. Apparently the trainers found it more difficult to avoid using expatiations in the non-expatiation groups, so that over four per cent of the responses in Group C and over six per cent in Group A were expatiations. This is in contrast to expansions, which were used almost exclusively with Group A.

The proportions of trainer utterances which were categorized as #3, "Eliciting Comments", or #4, "Other", are given in Table IV - 7 below. While "Other" remarks make up a substantial proportion of the total utterances for groups A and B, they constitute over 80 per cent of the utterances for Group C. This is as it should be, and indicates that



Table IV - 5. Proportion of Trainer Responses Which Were Expansions

Trainer	Group A ("Expansion")	Group B ("Expatiation")	Group C (Control)
Carol	34.47%	0%	0%
Linda	41.37	1.96	1.56
Penny	21.61	5.30	0
Average	32.06	2.73	0.63

Table IV - 6. Proportion of Trainer Responses Which Were Expatiations

Trainer	Group A ("Expansion")	Group B ("Expatiation")	Group C (Control)
Carol	12.62%	33.94%	9.86%
Linda	5.76	18.82	0
Penny	2.97	38.52	0
Average	6.81	30.30	4.43



Table IV - 7. Proportion of Responses that were "Eliciting Comments" or "Other"

Response Category	Trainer	Group A ('Expansion')	Group B ('Expatriation')	Group C (Control)
#3 Eliciting Comments	Carol	10.19%	26.06%	12.68%
	Linda	9.71	19.61	6.25
	Penny	23.30	20.85	0
	Average	14.31	21.62	8.23
#4 Other	Carol	42.72	40.00	77.46
	Linda	43.17	59.61	92.19
	Penny	52.12	35.34	100.00
	Average	45.97	45.23	86.71



the trainers were able to avoid both expansion and expatiation modelling quite successfully in the no-treatment control group.

Although the trainers were generally able to refrain from using expansions or expatiations with the control group children, it should not be thought that the control group children did nothing for the entire training sessions. They played with the toys and often interacted with one another and with the trainer. In one of the videotaped sessions, both children in the control group pair played the entire time with paper airplanes, and involved the trainer as well. They hid behind boxes, made airplane noises, laughed and obviously had fun. The children said very little in the entire half hour and the trainer did not expand or expatiate once. This low level of language behavior in the control sessions is worthy of note.

Many of the utterances of the language trainers during training sessions were not actually in response to anything said by the subjects. The eliciting comments and controlling remarks, for example, generally were not in response to child-utterances. It was decided to carry out a second analysis of trainer utterances, looking only at those which were in response to subject utterances. In the transcripts of each of the nine videotaped training sessions, the trainer responses that followed subject-utterances (other than simple "yes" and "no" responses) were classified as either "appropriate" or "inappropriate". An "appropriate" response was one in which the trainer responded as she was supposed to for that training group: with an expansion in Group A, with an expatiation in Group B, and with neither an expansion nor an expatiation in Group C. "Inappropriate" responses, on the other hand, were those in which the trainer used a type of response other than the one she was supposed to use for that training group. Thus for Group A, an expansion-



type response was "appropriate" while an expatiation, an eliciting comment, or any other type of trainer response was "inappropriate". The analysis of trainer responses in the Group A transcripts is given in Table IV - 8 below.

Of interest here is that the proportion of child utterances which were expanded (i.e. the proportion of trainer responses rate "appropriate") is 71.52%, considerably less than the 100 per cent in Cazden's (1965) study and closer to the rate at which middle class mothers are thought to expand the utterances of their two- and three-year-old children. (McNeill, 1970).

For Group B, an "appropriate" response was an expatiation, while expansions, eliciting remarks, and other responses were "inappropriate". Table IV - 9 below summarizes the trainer responses in the three videotaped Group B training sessions.

Here, the rate of appropriate responses (i.e. expatiation) following child-utterances appears to be somewhat lower than for Group A. Perhaps this reflects the difficulty of the task of expatiating. Each of the trainers reported finding the expatiation treatment to be the most difficult of the three. The trainers often felt that they needed to expand the child's utterance first in order to check on its meaning before they could expatiate successfully. When they were required to avoid expanding, as in Group B, they found it difficult to expatiate appropriately. They seemed to indicate an intuitive need for a combined method.

For Group C, the control group, an "inappropriate" response was defined as either an expansion or an expatiation, since the trainers were supposed to avoid these two types of model sentences with Group C. Eliciting remarks and other trainer comments were regarded as "appro-



Table IV - 8. Proportion of "Appropriate" and "Inappropriate" Trainer Responses in Group A Training Sessions

Trainer	Appropriate	Inappropriate	No Response
Carol	65.57%	32.79%	1.64%
Linda	72.37%	17.76%	9.87%
Penny	74.16%	21.35%	4.49%
Total	71.52%	21.85%	6.63%

Table IV - 9. Proportion of "Appropriate" and "Inappropriate" Trainer Responses in Group B Training Sessions

Trainer	Appropriate	Inappropriate	No Response
Carol	49.35%	50.65%	0%
Linda	50.00%	46.88%	3.12%
Penny	64.52%	34.67%	0.81%
Total	55.89%	42.76%	1.35%



priate" for purposes of tabulation of trainer responses. In fact, however, such responses were frequently equivalent to no response at all. For example, when Grace said "Stay up again tonight, maybe" and the trainer responded with "You're dripping glue on you". The response fails to recognize either the syntactic form or the semantic content of Grace's utterance and is in that sense the equivalent of "no response". In Table IV - 10 below, however, such responses are classified as "appropriate", which they are inasmuch as they neither expand nor expatiate. It is clear from Table IV - 10 that all of the three trainers were able to avoid expanding and expatiating child utterances with a high degree of success.

In summary, the study has demonstrated that it is quite possible for language trainers to learn three distinct ways of responding to children's attempts at verbal communication, and to use one or another of these response modes as requested.

##### 5. Suitability of Training Materials and Activities

The selection of language training materials and activities has been described in Chapter III. The present study provided an opportunity to observe the suitability of these various activities. The language trainers were asked to keep notes in their daily logs about the children's responses to the activities. These responses have been summarized in Table IV - 11, below.

The activities selected were not uniformly successful. Some were popular, and the children returned to them time and again. A few apparently went "over the heads" of nearly all of the children. This was particularly true of the tin-can telephones. None of the children



Table IV - 10. Proportion of "Appropriate" and "Inappropriate" Trainer Responses for Group C Training Sessions

Trainer	Appropriate	Inappropriate	No Response
Carol	25.50%	4.75%	69.80%
Linda	15.22	0	84.78
Penny	26.61	0	73.39
Total	24.34	2.30	73.36



really appreciated what they were supposed to be, and few found much pleasure in pretending that the tin-cans were telephones. Those who did enjoy the cans tended to use them for quite other purposes, such as digging in the sand. In the case of the box of groceries for the playstore, only a few of the children seemed to comprehend the nature of a store and of buying and selling. Many of the others, however, found the boxes and tins fascinating and enjoyed pretending to have meals with them and so on. The activity level was high, and much language was stimulated.

Generally speaking, activities that were popular in one group were also popular in the others. Their relative popularity can be judged from Table IV - 11. Clearly, sandtables are popular, and cutting and pasting activities are widely accepted. Some activities were found to be particularly good for encouraging make-believe. The large stand-up cutout figures were good for this, and so were the play dough, the sets of dishes, and the dress-up clothes. Other activities encouraged matching and classifying. Some children, for instance enjoyed matching the plastic farm animals in the sandtable with the felt animals on the flannel board and the pictures of farm animals in the picture books. Although a few activities seemed to fail completely to stimulate interest and language production, most appear to have been well chosen.

## B. Discussion

There were twenty-seven null hypotheses formulated for the present research. While there may appear to be some trend toward greater language growth under the expansion modelling treatment procedure than under the expatiation modelling procedure or under the control condition of no consistent modelling, the data support the rejection on only two



Table IV - 11. Language Training Activities, Showing Trainers' Assessments of Their Popularity with the Subjects (Numbers of Positive, Indifferent, and Negative Responses Noted in the Trainers' Daily Logs)

	Positive	Indifferent	Negative
Sandtable	169	3	2
Cutting, pasting and coloring	145	4	9
Picture books and magazines	92	13	6
Toy telephone	77	4	4
Cupcakes, juice and cookies	73	7	2
Play dough	70	6	11
Large constructions (castles, stoves)	55	7	18
Dress-up clothes	43	6	28
Groceries	32	2	1
Flannelboard and felt animals	25	3	12
Kittens, puppies, chicks, ducks	22	3	4
Handpuppets	20	4	13
Stand-up puppets	30	5	8
Umbrellas	19	4	12
Toy dishes	19	2	4
Paperbag masks	18	0	6
Happy faces	18	5	7
Tape-recorded sounds	17	5	2
Paper planes	13	6	6
Cars, boats, trucks	13	1	7
Brooms and dustpans	8	3	14
Saucer gardens	0	4	16
Tin can telephones	0	6	14



of the null hypotheses, viz. Hypothesis 6(a) and Hypothesis 6(b). (see page 11). The other hypotheses could not be rejected. There follows a discussion of several important issues in the study: possible reasons for the lack of further statistically significant differences; the striking differences in language behavior observed in the three treatment groups; the usefulness of language-sampling procedures; an assessment of the language measures employed; the feasibility of training language trainers; and the instructional content of the language lessons.

### 1. Lack of Statistically Significant Results

At least four factors can be cited as possibly contributing to the lack of statistically significant results. These would include the duration of treatment, the large variances in test results, the small sample sizes, and the organization of the children into pairs for language lessons.

(a) Duration of treatment. An examination of the posttreatment means reveals that modelling treatment groups exceeded the control group in five of the nine language measures, although the differences for the most part were statistically non-significant. This may suggest that a trend was developing which would have manifested itself more clearly had the study continued for a longer period of time. Although the subjects received an average of 19.2 hours of instruction, with all but three of the subjects receiving at least 18.0 hours, it is noteworthy that in a few instances the study was nearly half over before there was any attempt at verbal communication on the part of the child. It is impossible to say what would have been the effect of doubling or trebling the duration of the study, but it is conceivable that it would have accentuated intergroup differences to the level of statistical significance.



(b) Large variances in treatment groups. Table IV -12, below, gives the means and standard deviations for the posttreatment administration of nine language measures. It is clear that the variances were large in most cases. Since statistical significance is a function of variance and sample size, the existence of large variance and small samples requires that intergroup differences must be large to achieve significance.

Variance could probably have been reduced had it been possible to select for the study children whose language skills were more nearly alike. The nature of the institutional population available did not permit such selectivity. In fact, the children ranged in skill from some who spoke preponderantly single-word utterances to those who used many complete sentences, and from those whose active vocabulary was limited to only a few words to those whose vocabulary numbered in the hundreds. Such variability in performance was, of course, reflected in the measures used, e.g. Number of Sentences and Type Count.

(c) Small sample size. Again, small sample size, especially in combination with large test variances, meant that intergroup differences had to be very large to achieve significance. Had the samples been thirty to a group rather than thirty in all, perhaps some more of the observed mean differences would have achieved significance. As pointed out in Chapter III, section B, however, it was not possible to increase the sample size without either going beyond the institution or extending the group to include children who were below the level of one-word sentences and/or mature users of the language.

(d) Organization of children into pairs. In the design of the study, it was decided to group the children in pairs for language lessons. Two good reasons underlay this decision. First, it was



Table IV - 12. Pre-test and Post-test Means and Standard Deviations on Nine Language Measures, by Treatment Groups

Measure	Group A			Group B			Group C					
	N <sub>1</sub>	X <sub>1</sub>	SD <sub>1</sub>	N <sub>2</sub>	X <sub>2</sub>	SD <sub>2</sub>	N <sub>1</sub>	X <sub>1</sub>	SD <sub>1</sub>	N <sub>2</sub>	X <sub>2</sub>	SD <sub>2</sub>
Type Count	10	89.80	67.88	10	117.70	65.24	10	89.20	47.60	10	104.80	61.83
Type-Token Ratio	10	0.33	0.40	10	0.30	0.07	10	0.42	0.23	10	0.39	0.14
Utterances per Minute	10	4.41	2.59	10	6.01	2.65	10	5.83	4.75	10	5.29	3.01
Words per Minute	10	7.51	5.88	10	10.21	7.07	10	10.07	10.59	10	8.31	5.54
Mean Length of Utterance	10	1.65	0.84	10	1.85	0.58	10	1.92	0.81	10	1.83	0.66
Number of Sentences	10	25.60	37.78	10	34.70	37.10	10	22.60	22.63	10	23.50	21.41
Developmental Sentence Score	4	336.50	31.09	4	333.75	75.70	6	353.33	74.00	6	342.17	79.29
Peabody Picture Vocabulary Test	10	30.10	13.82	10	34.00	15.42	10	37.60	22.38	10	36.20	15.12
Imitation Test	9	34.67	24.11	9	35.44	23.24	10	31.60	35.12	10	42.90	31.84



believed that the social situation provided by two children and one trainer would generate more activity than a situation of only one child and one adult, and yet be simple enough to allow the trainer to respond to each child as needed. The modelling procedures being employed in Groups A and B depended on attempts at verbal communication by the subjects. It seemed reasonable to suppose that the increased amount of activity present in the pair situation would produce increased opportunities for conversation and hence increased opportunities for modelling.

The second reason for deciding to teach the children in pairs was that there would be an increased number of models for each child. The child whose utterance was being expanded or expatiated was being given a model, but so also was the other child who was able to observe both the initial utterance and the model in a meaningful context.

Experience in the study indicated that pairing did not have the effect intended and in some instances had an unintended confounding effect. It was found in many instances that the children in pairs did not participate jointly in the activities presented. Although there were instances of co-operative play, there were also many instances of parallel play with only minimal interaction between the subjects. Pairing did not always have the intended effect of enriching the social situation and increasing the opportunities for modelling. Moreover, in many instances those children who were not directly interacting with the language trainer were not participating in the interaction as observers, either. They were either in conversation with the trainer themselves, or they weren't paying any attention to the interaction. Pairing may have meant that one child did not receive modelling to nearly the same extent as the other even though they were in the same training room at the same time.



Pairing the children for treatment, in fact, made it difficult to know just how much modelling each child did receive. It was possible to count the number of hours that each child attended language lessons, but it was not possible to say how much of that time he was participating directly with the trainer. There may have been substantial differences in levels of interaction, so that some Group A and some Group B children may not have received any more modelling than did children in control Group C. (Comments by the trainers in their daily logs indicate that some of the children were very infrequent participants in verbal communication.)

There remains, of course, the possibility that statistically significant results were not demonstrated in the present study because neither of the experimental treatment approaches had any effect on the language performance of the children. The fact that Group A children used significantly more complete sentences, however, together with the possible trend mentioned earlier, suggests that we should not discard the treatment procedures too quickly. Moreover, the study yielded other information that is of interest, to be discussed in the sections to follow.

## 2. Differences in Language Behavior in the Three Treatment Groups

The design of the study required that each language trainer should be able to use quite different types of verbal behavior in each of the three treatment conditions. Although the trainers expressed some apprehension at the commencement of the study about their ability to achieve the flexibility required, the evidence taken from videotaped training sessions on three days over the course of the study indicates



that they were indeed successful. This is an encouraging finding. None of the language trainers had any previous training as a teacher, nor any special background in language development. Only one had a university degree, while one had a high school diploma. Yet within a relatively short time and with only a modest amount of training (approximately twelve hours) they were able to become skilful at expanding, expatiating, or avoiding either of these types of response as the situation demanded.

There are noteworthy findings about the language behavior in each of the treatment conditions. In Group A, the expansion-modelling group, it is noteworthy that the trainers expanded approximately 72 per cent of the subjects' utterances. Cazden (1965) used a 100 per cent expansion condition which was subsequently criticized by McNeill (1970). He argued that the 100 per cent expansion rate far exceeded the rate at which middle class parents normally expanded the utterances of their two- and three-year-olds, which McNeill estimates at about thirty per cent. The 72 per cent in the present study may be closer to Feldman's (1970) "contingent expansion" rate, in which the adult expands only those child-utterances for which the meaning is clearly understood.

The expatiation modelling treatment procedure appears to have been somewhat more difficult for the language trainers to carry out. Each trainer frequently expressed doubts about her success in the expatiation training sessions. Moreover, the videotaped training sessions indicate that on the average the trainers were able to expatiate appropriately only 56 per cent of the time, as compared with the 72 per cent successful expansion rate. One possible explanation for this is that expatiation requires an understanding of the intended meaning of the subjects' utter-



ance so that the language trainer can respond with a different sentence that will build on the child's meaning. An expansion, in contrast, may well be a tentative rephrasing of the child's utterance which serves to clarify the child's meaning as well as to provide an expansion model. For example, if the child were to say "Fiss", the trainer might wish to say "That's a fish, isn't it" in order to clarify the child's meaning. In doing so, she would be expanding. In the expatiation condition, however, the trainer was to avoid such responses, which in that treatment situation would have been "inappropriate", and respond instead with a statement. This proved to be a more difficult task.

Moreover, even if the meaning of the child's utterance is clear and requires no clarification, many of the utterances produced by children in the study were more difficult to expatiate than to expand. Many utterances were at the level of naming or identifying a single attribute. It is relatively easy to repeat such an utterance in an expanded, syntactically complete form, but relatively more difficult to add to the meaning of such a simple statement. Earlier studies using expansion and expatiation modelling separately (e.g. Cazden (1965) and Feldman (1970) used young, intellectually normal children who were more spontaneously verbal than the children in the present study. It may be that for young, normal children who are able to articulate fairly clearly and who are eager to talk, expatiation modelling is a viable technique. For nonverbal, mentally retarded children who frequently have articulation problems and who are not eager to talk, it is not a viable technique. It may be that a combination of expansion and expatiation modelling would be a useful tactic. For example, the trainer could respond to an utterance such as "Mommy hat" with, "Right, that's mommy's hat. You've got a hat just like it, too." or again, "Mommy'll get you your hat. Then we'll



go outside." This would be more like normal parental modelling, which merits further study.

The language behavior in the control group training sessions is particularly interesting. Table IV - 10 indicates that the language trainers quite successfully avoided expansion and expatiation modelling, and very largely limited their utterances to controlling comments and pleasantries. The children in Group C were active each day, involved in interesting activities, and received some verbal instruction from their trainers. Language usage, however, was at a very low level. One could compare this situation to the typical ward situation in which a small number of adults direct the activities of a larger number of children. There is activity, and the children may find interesting things to do. They receive a certain amount of verbal direction from the adults, but little conversation. There is a need for a close analysis would indicate that the typical ward language behavior would closely approximate the language behavior in Group C.

### 3. The Usefulness of Language Sampling Procedures

Tape-recorded and transcribed language samples formed the basis for seven of the nine measures used, as well as for the Developmental Sentence Types analysis. Therefore, the accuracy of the samples was of great importance. In spite of difficulties occasionally encountered with the recording procedure (e.g. when subjects moved around the room away from the microphone) the samples were shown to have a satisfactory degree of reliability.

The language samples provided valuable information concerning sentence structure and vocabulary. The study demonstrated that it is



feasible in a fairly short period of time to train people with no previous training and little related experience to take reliable language samples. These samples can be used to estimate language growth. Equally important, however, they provide information about the current language status of the child which can be used in planning a program of language training.

#### 4. An Assessment of the Language Measures Employed

The language measures used in the present study were selected from several sources and aimed to give information concerning both competence and performance in the dimensions of fluency, vocabulary, and syntax. One was a published test (PPVT), another (The Imitation Test) a constructed test based on a similar test reported in the literature, while the remaining measures were various analyses of the language samples. The measures were not uniformly useful.

Table IV - 4 shows the interrelationships among eight measures. One measure, the Type Token Ratio, stands out as correlating poorly with the other measures. Correlation coefficients for TTR vary from -0.301 to +0.339, all low. The Peabody Picture Vocabulary Test, too, showed several low but positive correlations, especially with Type Count (0.390 on the pretest), Type Token Ratio (0.339 and 0.021), Words per Minute (0.279 and 0.383), Utterances per Minute (0.251 and 0.307) and Number of Sentences (0.348 and 0.335). For the others, the correlations were all positive and generally fairly high, ranging from 0.366 to 0.885, with 25 out of 30 being above 0.62 and 27 of them above 0.50.

Type Token Ratio appears to be of limited utility in the present study. Loban (1963) used it with kindergarten children as a measure



of flexibility of active vocabulary. Such children typically have vocabularies numbering in the thousands of words. It may be that for such children, TTR can be useful in distinguishing between those children who use only a few words in a repetitive and stereotyped manner (a low TTR) and those who show more flexibility and variety (a high TTR). The TTR would be particularly influenced by the extensive use of prenominal adjectives and other modifiers. Children in the present study, however, were generally at a more fundamental language level than Loban's kindergarten children. Their verbal utterances were often meagre and limited to designative statements and mands. It is likely that fluctuations in TTR do not represent fluctuations in flexibility for them in the same manner as they do for normal kindergarten children.

The low correlations on the Peabody Picture Vocabulary Test may suggest that it is measuring a different dimension of language than are the others. It is interesting that the correlation between PPVT and Type Count, presumably both measure of vocabulary, was low for the pretest scores (0.390). It was considerably higher (0.611) for the posttest scores. It may be that the language training program encouraged children to use in their active vocabulary more of the words that they had in their receptive vocabulary. The PPVT scores seem to be questionable value in measuring language growth in the present study. It may be that it is not a sensitive enough instrument to detect changes over a short period.

The Imitation Test showed the highest correlation between pretest and posttest scores of any of the measures. It also showed relatively



high positive correlations with the other language measures (except Type Token Ratio). There was very little change in group mean scores, however, from pretest to posttest. It may be that it, too, is not sensitive enough to detect changes over a short period of time.

#### 5. The Feasibility of Training Language Trainers

The study made use of three language trainers who, prior to the study, had no special training in language development. Their credentials varied and included one bachelor of arts degree, one rehabilitation counsellor diploma, and one high school diploma. They were given only a short training period of about twelve hours, following which they were able to implement two different modelling procedures or to avoid the use of either, as required, with a quite satisfactory degree of success.

It seems likely that most intelligent adults regardless of formal educational level could learn the training techniques used in this study. This has rather interesting implications for the preparation of ward staff. It should be possible in a relatively short period of time, especially with the aid of videotaped demonstrations, to teach ward staff methods of modelling language for the children in their care.

#### 6. The Instructional Content of Language Lessons

The sequence of language lessons is given in Appendix H. As noted earlier (in Chapter IV) the lessons were not uniformly interesting to the children. In a few instances, the activities involved



concepts (e.g. tin-can telephones) that were too difficult for the children. Generally, manipulative activities, picture books and magazines, toy plastic telephones, playdough, etc. were well received and captured the children's interest.

The activities chosen for the present study were organized around themes such as household activities, transportation, and pets. There is an unlimited variety of such themes available. On the wards and elsewhere within the institution there are many possible materials and activities which are of interest to the children. Since the key feature of the training program was not the specific activities that were chosen but rather the regular language modelling presented in an interesting and meaningful context, it would seem entirely possible that many opportunities for language training of this type exist throughout the institution without any very elaborate extra preparations being made.



## CHAPTER V

### CONCLUSIONS, IMPLICATIONS, LIMITATIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

#### A. Conclusions

In the present study, thirty moderately to severely mentally retarded, institutionalized children ranging in age from eight to sixteen years engaged in a language training project for a period of ten weeks. The selected subjects were all capable of producing language at least at the level of two-word utterances, but were not yet mature users of the language. Their language performance was comparable to that of normal children from two to five years of age. The subjects were randomly assigned to three treatment groups: an expansion modelling group, an expatiation modelling group, and a control group in which there was no consistent modelling. The subjects met in pairs, five times each week with a language trainer for half-hour language training sessions. The training sessions used a variety of manipulative and dramatic play activities to encourage verbal communication and thus provide opportunities for language modelling in a meaningful context. The language trainers, all institutional staff members, were assigned to the treatment groups daily on a random basis. Language maturity was assessed before the training project began, and again at its conclusion, using two tests and several measures derived from language samples.

The study asked the questions, "Does consistent language modelling lead to more mature language competence and performance?" and, "Which of two modelling procedures, expansion or expatiation, is more beneficial?" The results obtained suggest superiority of the modelling groups on



five of the language measures, although in most instances the differences failed to achieve statistical significance. This possible trend in favor of modelling, and especially expansion modelling, is heartening, and suggests that further research is indicated.

The observed differences among treatment groups achieved statistical significance on more measure, viz. number of sentences. The expansion modelling group used significantly more complete sentences following treatment than did either of the other groups. This is of particular interest. In our language system in which the complete subject-verb-object sentence is seen as the "mature" utterance and a long step beyond mere naming and one-word mands, a training procedure which leads to significantly greater production of complete sentences is of value.

The study also looked for differences between children and Down's Syndrome and those of other etiologies with respect to language maturity following treatment. It failed to detect any statistically significant differences. On the language measures used in the present study, Down's Syndrome children did not differ significantly from the retarded children with other etiologies, regardless of treatment group.

## B. Implications

The study has provided useful insights about possible language training techniques. It has demonstrated that the language modelling techniques can be learned with relative ease by adults without extensive previous training. The language trainers employed in the



study included an institutional aide, a rehabilitation counsellor, and a psychologist, all of whom learned the techniques and demonstrated the ability to use each technique to the exclusion of the others. If these three trainers could learn to produce the three strikingly different response types, on command, then perhaps the same techniques could be learned by ward aides, parents, house parents, child care workers, teachers, and many others who have regular contacts with children.

The study made use of a variety of activities and materials that are readily available in any good preschool program and most homes. It demonstrated that potentially useful materials exist in many places, and that it is not necessary to purchase special teaching materials. For that reason the approach is extremely flexible. It could be implemented at home, on the ward, in the cafeteria, on trips uptown, or virtually anywhere. If more of the results were significant, the implications of this would be particularly exciting. When one considers the hours and hours of ward activity, essentially non-verbal, occurring daily, one realizes the potential for language training which is lost. This study has demonstrated the feasibility of training ward staff in a technique which could perhaps make productive use of that time. Since expansion modelling led the children in the study to use more complete sentences, perhaps the utilization of the same techniques on the ward could lead more children to extend their language in similar ways.

The study made extensive use of language samples in assessing levels of language maturity. It demonstrated the feasibility of taking reliable language samples yielding much information about the language system used by the child. This has implications for institutional



language training programs. Language samples can quickly yield information about the extent of expressive vocabulary, about the length of utterances employed by the child, and about the proportion of utterances that have achieved the status of complete sentences.

### C. Limitations

One obvious limitation in the present study was the duration of the language training program. At the most, a subject received twenty-two hours of training and, on the average, it was actually a little over nineteen hours. For mentally retarded children, a longer period would be desirable. There were practical limitations to the amount of time available for the present study: in a field study, especially one involving the co-operation of several departments of a large institution, it is not always possible to have as much time as one would want. Moreover, there was some evidence (e.g. Smith, 1962; Rhodes *et al.*, 1969) that other studies had found significant language growth over periods of time no longer than the period of the present study. Nevertheless, a longer training program would be desirable.

A second limitation concerns the selection of subjects. The institutional population available did not permit the selection of subjects with identical or very similar initial language levels. As a consequence, there was considerable variance in all of the language measures used. Nor was it possible to select a large number of subjects, since the majority of residents were preverbal and therefore not eligible to participate in the study. This is a limitation which developed out of the policy of normalization and deinstitutionalization which coincided with the present study.



Some of the measures employed proved to be of limited value in assessing language gains, at least over the short period of the study. The Peabody Picture Vocabulary Test, the Imitation Test, and the Type Token Ratio were not very useful.

The grouping of children in pairs for language instruction proved to be another limitation. It may have failed to have the desired effect of increasing language opportunities. The number of models observed by each child was not necessarily increased, since it was observed often that the child who was not directly engaged in conversation with the trainer was not observing the language model presented to the other child. Such grouping made it difficult to tell just how much verbal interaction each child engaged in, which may have led to quite substantial variations in the amount of modelling received, even among members of the same treatment group.

A further difficulty was encountered in the use of two modelling procedures. It is questionable that the distinction between expansion and expatiation modelling should be maintained. Language trainers encountered difficulty in trying to expatiate hard-to-understand utterances without first expanding them in order to confirm that he had correctly grasped the child's meaning. Perhaps a more viable modelling procedure would involve a combination of expansion and expatiation. This would more nearly approximate a normal conversational situation and still provide the child with syntactically correct models in meaningful situations.

Finally, the study was limited by being carried out in a playroom situation. If it is important that the subjects be interested in an activity or material enough to want to try to communicate about it, then



restricting the training sessions to a playroom with sandtable, toys, and other play materials may have posed a limitation for some children. Other materials, activities, and locations might have been more interesting and stimulating.

#### D. Recommendations for Further Study

Several recommendations can be made regarding further studies of this sort:

1. the duration of the training period should be much longer;
2. the number of subjects should be considerably larger;
3. there should be a greater degree of homogeneity of subjects with respect to initial levels of language maturity;
4. there should be greater control over the degree of trainer-subject interaction, probably through the use of a one-to-one training situation; and
5. consideration should be given to a single modelling procedure which combines both expansion and expatiation modelling.

One can envisage potentially useful studies exploring the effectiveness of modelling in a ward situation over a period of eight months or a year. Also, a study might usefully explore the effects of parent training in modelling procedures, followed by a long-term training project in which parents carried out a language modelling training project with their children.

#### E. Final Statement

The present study has investigated the effectiveness of language modelling procedures and an activity program in increasing the linguistic



maturity of retarded children's language. It is related to previous work by Cazden (1965), Brown (1968), and Feldman (1970) which has explored the use of models by normal children in acquiring their language system. It is also related to the work of Lyle (1960), Rhodes *et al* (1969), Smith (1962) and Heber (1970) who have explored the usefulness of language enrichment programs in promoting language growth in retarded children. It has explored the relative value of expansion and expatiation modelling in the context of a language-enrichment activity program. The results suggest the possibility of a very practical language modelling approach using everyday materials in a wide variety of situations. The results are sufficiently encouraging to merit further study.



## References

- Baer, D., & Guess, D. Receptive training of adjectival inflections in mental retardates. *Journal of Applied Behavioral Analysis*, 1971, 4, 129-139.
- Baldwin, A. L. *Theories of child development*. New York: John Wiley, 1967.
- Belmont, J. M. Medical-behavioral research in retardation. In N. R. Ellis (Ed.), *International Review of Research in Mental Retardation*, Volume 5. New York: Academic Press, 1971.
- Benda, C. E. Mongolism. In C. H. Carter (Ed.), *Medical aspects of mental retardation*. Springfield, Ill.: Chas. C. Thomas, 1965.
- Blindert, H. D. Interactions between residents and staff: a qualitative investigation of an institutional setting for retarded children. *Mental Retardation*, 1975, 13(5), 38-40.
- Bloom, L. M. *Language development: Form and function in emerging grammars*. Cambridge, Mass.: M.I.T. Press, 1970.
- Bowerman, M. F. Discussion summary-development of concepts underlying language. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), *Language Perspectives-Acquisition, Retardation, and Intervention*. Baltimore: University Park Press, 1974.
- Brinkworth, R. The unfinished child: Effects of early home training on the mongol infant. In A. B. D. Clarke, & A. M. Clarke (Eds.), *Mental retardation and behavioral research*. Edinburgh: Churchill Livingstone, 1973.
- Brown, R. The development of Wh-questions in child speech. *Journal of Verbal Learning & Verbal Behavior* 1968, 7, 279-290.
- Brown, R. *A first language: The early stages*. Cambridge, Mass.: Harvard University Press, 1973.
- Brown, R., & Bellugi, U. Three processes in the child's acquisition of syntax. In E. Lenneberg (Ed.), *New directions in the study of language*. Cambridge, Mass.: M.I.T. Press, 1964.
- Brown, R., & Berko, J. Word association and the acquisition of grammar. *Child Development*, 1960, 31, 1-14.
- Brown, R., Cazden, C., and Bellugi-Klima, U. The child's grammar from I to III. In J. P. Hill (Ed.), *Minnesota symposia on child psychology*, vol. 2. Minneapolis: U. of Minnesota Press, 1969.



- Burton, T. The trainable mentally retarded. In N. G. Haring (Ed.), *Behavior of Exceptional Children*. Columbus, O.: Chas. E. Merrill, 1974, 413-446.
- Cazden, C. Environmental assistance to the child's acquisition of grammar. Unpublished doctoral dissertation, Harvard University, 1965.
- Cazden, C. The acquisition of noun and verb inflections. *Child Development*, 1968, 39, 433-448.
- Cazden, C. B. The hunt for independent variables. In R. Huxley and E. Ingram (Eds.), *Language Acquisition: Models and Methods*. London: Academic Press, 1971.
- Chomsky, N. A review of B. F. Skinner's *Verbal Behavior*. In J. Fodor, & J. Katz (Eds.), *The structure of language*. Englewood Cliffs, N. J.: Prentice-Hall, 1964.
- Clay, M. M. Sentence repetition: Elicited imitation of a controlled set of syntactic structures by four language groups. *Monographs of the Society for Research in Child Development*, 1971, 36, (3).
- Cromer, R. F. Receptive language in the mentally retarded: Processes and diagnostic distinctions. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), *Language Perspectives-Acquisition, Retardation, and Intervention*. Baltimore: University Park Press, 1974.
- Crozier, L. R. Teaching receptive vocabulary to young mongoloid children: a behavior modification study. Unpublished M. Ed. thesis, University of Alberta, 1970.
- Dailey, W. F., Allen, G. J., Chinsky, J. M. and Veit, S. W. Attendant behavior and attitudes toward institutionalized retarded children. *American Journal of Mental Deficiency*, 1974, 78(5), 586-591.
- Dunn, L. M. *Peabody Picture Vocabulary Test Manual*. Circle Pines, Minnesota. American Guidance Service, 1965.
- Dunn, L. M. (Ed.). *Exceptional children in the schools: Special education in transition*. New York: Holt, Rinehart, & Winston, 1973.
- Ervin-Tripp, S. An overview of theories of grammatical development. In D. Slobin (Ed.), *The ontogenesis of grammar*. New York: Academic Press, 1971.
- Feldman, C. F. The effects of various types of adult responses in the syntactic acquisition of two to three year olds. Unpublished paper, University of Chicago, 1970.
- Flouriort, M. The residential ward as a verbal environment. Unpublished doctoral dissertation, University of Rochester, 1973.



- Fraser, C., Bellugi, U., & Brown, R. Control of grammar in imitation, comprehension and production. *Journal of Verbal Learning and Verbal Behavior*, 1963, 2, 121-135.
- Graham, J. T., & Montgomery, L. W. Language characteristics of the mentally retarded. Paper presented at the American Association on Mental Deficiency Conference at San Francisco, 1969.
- Graham, N. C. Short term memory and syntactic structure in educationally subnormal children.
- Guess, D., Rutherford, G., Smith, J. O., & Ensminger, E. Utilization of sub-professional personnel in teaching language skills to mentally retarded children: An interim report. *Mental Retardation*, 1970, 8, 17-23.
- Guthrie, J. T. Feedback and sentence learning. *Journal of Verbal Learning and Verbal Behavior*, 1971, 10, 23-28.
- Haring, N. G. (Ed.). *Behavior of exceptional children*. Columbus, O.: Charles E. Merrill, 1974.
- Hartmann, R. R. K., & Stork, F. C. Dictionary of language and linguistics. New York: John Wiley, 1972.
- Hayden, A. H., Haring, N. G., & Allen, K. E. *Selected case studies*. University of Washington Model Preschool Center for Handicapped Children, 1974.
- Heber, R. *An experiment in the prevention of cultural-familial mental retardation*. Madison, Wis.: Rehabilitation Research & Training Center in Mental Retardation, 1972.
- Jakobson, R., & Halle, M. *Fundamentals of language*. Gravenhage: Mouton, 1956.
- Jenkins, J. J. The acquisition of language. In D. A. Goslin (Ed.), *Handbook of socialization theory & research*. Chicago: Rand McNally, 1969.
- Johnson, R. D., & Abelson, R. B. The behavioral competence of mongoloid and non-mongoloid retardates. *American Journal of Mental Deficiency*, 1969, 73, 856-857.
- Jordan, T. Language & mental retardation: a review of the literature. In R. L. Schiefelbusch, R. H., Copeland, & J. O. Smith (Eds.), *Language & mental retardation*. New York: Holt, Rinehart, & Winston, 1967.
- Kincaide, P. S. Normalization and the handicapped. *Mental Retardation Bulletin*, 1975, 3, 128-132.



- Klima, E. S., & Bellugi, U. Syntactic regularities. In J. Lyons & J. Wales (Eds.), *Psycholinguistic papers*. Edinburgh: Edinburgh University Press, 1966.
- Kolstoe, O. P. Language training of low-grade mongoloid children. *American Journal of Mental Deficiency*, 1958-'59, 63, 17-30.
- Krasner, L. Studies of the conditioning of verbal behavior. *Psychological Bulletin*, 1958, 55, 148-170.
- Lee, L. L. *Developmental sentence analysis*. Evanston, Ill. Northwestern University Press, 1974.
- Lee, L., & Canter, S. M. Developmental sentence scoring: A clinical procedure for estimating syntactic development in children's spontaneous speech. *Journal of Speech and Hearing Disorders*, 1974, 36, 315-338.
- Lenneberg, E. H. Language disorders in childhood. *Harvard Educational Review*, 1964(a), 34, 152-177.
- Lenneberg, E. H. Speech as a motor skill with special reference to nonaphasic disorders. In U. Bellugi, & R. Brown (Eds.). *The acquisition of language. Monographs of the Society for Research in Child Development* 29(1), 1964(b).
- Lenneberg, E. H. *Biological foundations of language*. New York: Wiley, 1967.
- Lenneberg, E. H. A biological perspective of language. In R. D. Oldfield, & J. C. Marshall (Eds.), *Language*, Middlesex, Eng.: Penguin Books, 1968.
- Loban, W. D. *The language of elementary school children*. National Council of Teachers of English Research Report No. 1, 1963.
- Lovell, K., & Bradbury, B. The learning of English morphology in educationally subnormal special school children. *American Journal of Mental Deficiency*, 1967, 71, 609-615.
- Lovell, K., & Dixon, E. M. The growth of the control of grammar in imitation, comprehension, and production. *Journal of Child Psychology and Psychiatry*, 1967, 8, 31-39.
- Luria, A. R. *The role of speech in the regulation of normal and abnormal behavior*. New York: Liveright Publ. Co., 1961.
- Lyle, J. G. The effect of an institution environment upon the verbal development of imbecile children: I. verbal intelligence. *Journal of Mental Deficiency Research*, 1959, 3, 122-128.
- Lyle, J. G. The effect of an institution environment upon the verbal development of imbecile children: II. speech and language. *Journal of Mental Deficiency Research*, 1960(a), 4, 1-13.



- Lyle, J. G. The effect of an institution environment upon the verbal development of imbecile children: III. the Brooklands residential family unit. *Journal of Mental Deficiency Research*, 1960(b), 4, 14-23.
- Macaulay, B. D. A program for teaching speech and beginning reading to nonverbal retardates. In H. Sloane, & B. D. Macaulay (Eds.), *Operant procedures in remedial speech and language training*. Boston: Houghton Mifflin, 1968.
- Macnamara, J. Cognitive basis of language learning in infants. *Psychological Review*, 1972, 79, 1-13.
- Malouf, R. E. and Dodd, D. H. Role of exposure, imitation, and expansion in the acquisition of an artificial grammatical rule. *Developmental Psychology*, 1972, 7, 195-203.
- Matthews, J. Communication disorders in the mentally retarded. In L. E. Travis (Ed.), *Handbook of speech pathology*. New York.: Appleton-Century-Crofts, 1971, 801-818.
- McCarthy, D. Language development in children. In L. Carmichael (Ed.), *Manual of child psychology*. New York. John Wiley, 1954.
- McCarthy, J. J. The importance of linguistic ability in the mentally retarded. *Mental Retardation*, 1964, 2, 90-96.
- McCarthy, J. M. Patterns of psycholinguistic development of mongoloid and non-mongoloid severely retarded children. Unpublished doctoral dissertation, University of Illinois, 1965.
- McNeill, D. The creation of language. In R. C. Oldfield and J. C. Marshall (Eds.), *Language*. Middlesex, England: Penguin Books, 1968.
- McNeill, D. *The acquisition of language: The study of developmental psycholinguistics*. New York: Harper & Row, 1970.
- Mein, R., & O'Connor, N. A study of the oral vocabularies of severely subnormal patients. *Journal of Mental Deficiency Research*, 1960, 4, 130-143.
- Menyuk, P. *Sentences children use*. Cambridge, Mass.: M.I.T. Press, 1969.
- Miller, G. A. Language & psychology. In E. Lenneberg (Ed.), *directions in the study of language*. Cambridge, Mass.: M.I.T. Press, 1964.
- Miller, W., & Ervin, S. The development of grammar in child language. In U. Bellugi, & R. Brown (Eds.). *The acquisition of language. Monographs of the Society for Research in Child Development*, 1964, 29.



- Miller, J. F., and Yoder, D. E. An ontogenetic language teaching strategy for retarded children in R. L. Schiefelbusch and L. L. Lloyd (Eds.), *Language Perspectives-Acquisition, Retardation and Intervention*. Baltimore: University Park Press, 1974.
- Moerck, E. Specific cognitive antecedents of structures and functions involved in language acquisition. *Child Study Journal*, 1973, 3(2), 77-90.
- Moerck, E. Changes in verbal child-mother interactions with increasing language skills of the child. *Journal of Psycholinguistic Research*, 1974, 3(2), 101-116.
- Morehead, D. M., and Morehead, A. From signal to sign: A Peagetian view of thought and language during the first two years. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), *Language Perspectives-Acquisition, Retardation and Intervention*.
- Nelson, K. Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development*, 1973, 38.
- O'Connor, N. Speech and thought in severe subnormality. In P. Mussen, (Ed.), *European research in cognitive development. Monographs of the Society for Research in Child Development*, 30(2), 1965.
- O'Connor, N. Speech and thought in the retarded. In A. B. D. Clarke and M. M. Lewis (Eds.), *Learning, Speech and Thought in the Mentally Retarded*. London: Butterworth, 1972.
- O'Connor, N., & Hermelin, B. *Speech and thought in severe subnormality*. New York: Pergamon Press, 1963.
- Olson, D. R. Language & thought: Aspects of a cognitive theory of semantics. *Psychological Review*, 1970, 77, 257-273.
- Osser, H., Wand, M. D., & Zaid, F. The young child's ability to imitate and comprehend speech: A comparison of two subcultural groups. *Child Development*, 1969, 40, 1063-1075.
- PARD Associates Ltd. *A.S.H./Deerhome development centre: Preliminary report*. Calgary: PARD, 1975.
- Peterson, R. F. Imitation: A basic behavioral mechanism. In H. Sloane and B. D. Macaulay (Eds.), *Operant procedures in remedial speech & language training*. Boston: Houghton Mifflin, 1968.
- Rhodes, L., Gooch, B., Siegelman, E. Y., Behrns, C., & Metzger, R. *A language stimulation and reading program for severely retarded mongoloid children*. California Mental Health Research Monograph #11, 1969.
- Rosen, M. The acquisition of language. In R. Hyatt and N. Rolnick (Eds.), *Teaching the Mentally Handicapped Child*. New York: Behavioral Publications, 1974.



- Risley, T., & Wolf, M. Establishing functional speech in echolalic children. In H. Sloan, & B. D. Macaulay, (Eds.), *Operant procedures in remedial speech and language training*. Boston: Houghton Mifflin, 1968.
- Sailor, W., Guess, D., and Baer, D. M. Functional language for verbally deficient children: an experimental program. *Mental Retardation*, 1973, 11(3), 27-35.
- Sapir, E. *Language: An introduction to the study of speech*. New York: Harcourt Brace, 1921.
- Schiefelbusch, R. L. A discussion of language treatment methods for mentally retarded children. *Mental Retardation*, 1965, 3, 4-7.
- Schiefelbusch, R. L., Copeland, R. H., & Smith, J. O. (Eds.), *Language & mental retardation*. New York: Holt, Rinehart, & Winston, 1967.
- Searle, J. *Speech acts*. London: Cambridge University Press, 1969.
- Siegel, G. M. Language behavior of adults and retarded children in interpersonal assemblies. *Journal of Speech & Hearing Disorders Monograph Supplement*, 1963, 10, 8-31.
- Sinclair, H., & Bronckart, J. P. S.V.O.: a linguistic universal. A study in developmental psycholinguistics. *Journal of Experimental Child Psychology*, 1972, 14, 329-348.
- Skinner, B. F. *Verbal Behavior*. New York: Appleton Century Crofts, 1957.
- Smith, J. O. Group language development for educable mental retardates. *Exceptional children*, 1962-'63, 29, 95-101.
- Snow, C. E. Mother's speech to children learning language. *Child Development*, 1972, 43, 549-565.
- Stemmer, N. Semantic approaches to language acquisition. *Language Sciences*, 1973, 26, 4-6.
- Snyder, L. K., Lovitt, T. C., & Smith, J. O. Language training for the severely retarded: Five years of behavior analysis research. *Exceptional children*, 1975, 42(1), 7-15.
- Spradlin, J. E. Language & communication in mental defectives. In N. R. Ellis (Ed.), *Handbook of mental deficiency*. New York: McGraw Hill, 1963.
- Spradlin, J. E., & Rosenberg, S. Complexity of adult verbal behavior in a dyadic situation with retarded children. *Journal of Abnormal and Social Psychology*, 1964, 68(b).



- Tizard, B., Cooperman, O., Joseph, A., and Tizard, J. Environmental effects on language development: A study of young children in long-stay residential nurseries. *Child Development*, 1972, 43, 337-358.
- Villiger, U. and Mathis, A. The language of mongoloids. *Heilpädagogik*. 1972, 41(2), 131-138.
- Vygotsky, L. S. *Thought and language*, Cambridge, Mass.: M.I.T. Press, 1962.
- Wardhaugh, R. Theories of language acquisition in relation to beginning reading instruction. *Reading Research Quarterly*, 1971, 8, 168-194.
- Weir, R. *Language in the crib*. The Hague: Mouton, 1962.
- Whyte, L. Developmental characteristics of young trainable mentally retarded children. *Mental Retardation Bulletin*, 3(1), 1975-1976. 140-145.
- Wolfensberger, W. *The principle of normalization in human services*. Toronto: National Institute of Mental Retardation, 1972.
- Wood, N. E. *Delayed speech & language development*. New York: Prentice Hall, 1964.
- Woodward, M. The development of idiots interpreted by Piaget's theory of sensorimotor development. *British Journal of Psychology*, 28-29, 1959.
- Woodward, M. The application of Piaget's theory to the training of the subnormal. *Journal of Mental Subnormality*, 8, 1962.
- Zigler, E. Mental retardation: Current issues & approaches. In L. W. Hoffman, & M. L. Hoffman (Eds.), *Review of child development research, volume two*. New York: Russell Sage Fdn., 1966.



Appendix A: CONSTRUCTION,  
ADMINISTRATION, AND SCORING  
OF THE IMITATION TEST (IT)



## 1. Construction and Administration

The sentence repetition test devised by Clay (1971) offered some promise as a useful instrument for the present study. It was designed for use with children of normal intelligence between the ages of five and seven years with different language experience backgrounds, including some non-English backgrounds. Clay surveyed the literature relating to memory span for five-year-olds, and relating to the acquisition of sentences of increasing length and complexity. She then developed a 36-item sentence repetition test which controlled many characteristics of the stimulus material, such as sentence type, sentence length, vocabulary familiarity, phrasing and pausing, and semantic or topic familiarity. Her original intention was to include items which would be grammatical, unrelated sentences comprising eight variant forms of each of six sentence types. The variant forms included (a) imperatives, (b) declaratives, (c) question transformations, (d) expanded declaratives, (e) unusual expansions of declaratives, (f) preposed movable phrases, (g) relative clauses. The six sentence types include (a) N, be + sentences, (b) NV + sentences, (c) NVN sentences, (d) NVNN sentences, (e) NVN + sentences and (f) Here, be + sentences. Early work with the instrument, however, indicated that the first two variants, imperatives and declaratives, were too easy for her five-year-olds and they were dropped from the test, leaving 36 items comprising six variant forms of six sentence types.

It was felt that with mentally retarded children, Clay's deleted sentences would probably not be too easy. An initial repetition test was prepared, therefore, using the eleven deleted sentences and some of the easier sentences in the Clay test. The result was an initial



20-item sentence-repetition test using the eleven "easy", deleted Clay items followed by the first nine items of the Clay test.

A pilot administration of this sentence-repetition test indicated that for rather nonverbal retarded children even this was too difficult. Several children were unable to repeat more than the first item. It was decided therefore to include items that were even simpler than the easiest of the Clay items. In order to do this, an examination was made of the actual utterances of the first few children in their initial language-sampling interviews. A number of two-, three- and four-word strings were found that could possibly be used as test items. Brown (1972) has discussed the major meanings at "Stage I" in children's language. This is the stage which, according to Brown (1973) "begins as soon as the MLU rises above 1.0, when multiword utterances begin, and ends at 2.0 (p. 58)". There is a set of eight minimal two-term relationships as follows:

1. agent and action
2. action and object
3. agent and object
4. action and locative (or location)
5. entity and locative (or location)
6. possessor and possession
7. entity and attributive
8. demonstrative and entity

Six utterances were selected which could be described as examples of relationships (2), (5) and (7) above. These six utterances constituted the first six items of the final form of the Imitation Test.

Lee (1974) has described several ways in which children expand the



three elements of the basic sentence, subject, verb, use of the copula, negation of verbs, and the introduction of "wh" question. Ten utterances were taken from language-sampling interviews which were representative of these forms. Two of them were noun-phrase elaborations that did not achieve sentence status. The remaining eight items were sentences. Two of them (items 9 and 10 of the Imitation Test) included verb elaborations. Two more (items 11 and 12) included the copula verb. Two more (items 13 and 14) used negation of verbs. The remaining two (items 15 and 16) were "wh" questions.

These utterances from language-sampling interviews, then, constituted the first sixteen items of the Imitation Test used in the present study. To these sixteen items were added the eleven "easy" items which Clay had deleted, yielding a 27-item sentence-repetition test, the Imitation Test (I.T.). A copy of the test and the instructions for its administration follows below. It was felt that the test was simple enough that all of the subjects could repeat at least a few items successfully, yet difficult enough that none of the subjects would get it entirely correct. Nevertheless, when the test was given the examiner had available sheets containing the Clay test, to be used with subjects who got everything right on the I.T. should that happen. It did not.

## 2. Scoring

In scoring the Imitation Test, each word repeated correctly was given a score of +1, and an additional +1 was given if the entire stimulus utterance was repeated correctly. The only imperfect responses not counted as errors were failures to articulate correctly (e.g. "f"



for "th") and even here the misarticulations were counted as errors if they involved inflections (e.g. the plural /s/). Thus, a child who said "i-cream" for "ice-cream" in item 1 would receive credit, but if he said "Duck" for "Ducks" in item 10, he would not. The child's score on the I.T. was the total number of points earned.



Name \_\_\_\_\_ Date \_\_\_\_\_

IMITATION TEST

INSTRUCTIONS:

- (a) Say: "Say this for me. Say 'ball'."
  - (b) Encourage the child. If the child makes no response to a stimulus, you may repeat the whole sentence a second time in an attempt to elicit a response.
  - (c) Record the child's exact response verbatim, using the space above the stimulus sentence; if that response differs from the stimulus sentence.
1. More ice-cream.
  2. There book.
  3. Puppy out.
  4. Want popcorn.
  5. That blue.
  6. Horsie barn.
  7. The red ball.
  8. Two big green buses.
  9. I am eating.
  10. Ducks can fly.
  11. The ball is red.
  12. Bill was a cowboy.
  13. Don't do that.
  14. I don't want it.
  15. Who is that?
  16. What is he doing?
  17. Be careful.
  18. Walk slowly.
  19. Get an apple.



20. Paint the teacher a picture.
21. Eat this bread for tea.
22. The puppies are black.
23. He ran to school.
24. The children are playing ball.
25. Mother bought the cat some fish.
26. They put the car in the garage.
27. Here's Peter's bicycle.



Appendix B: MEASURES OF  
RELIABILITY OF LANGUAGE  
SAMPLES



Three measures of reliability were used in order to establish the reliability of the language samples taken during the pre-training and post-training language-sampling interviews. On twelve occasions during the interview the investigator took twenty-minute language samples of his own for comparison with the samples taken by the two language-sample interviewers. Thus there were twelve pairs of transcripts available for comparison. Comparisons made included Mean Length of Utterance (MLU), Developmental Sentence Scores (DSS), and Type Token Ratio (TTR). Each of these measures was computed for the samples taken by the investigator and compared with the same measures for the same interview segments as recorded by the language-sampling interviewers. Product-moment correlations were computed as measures of reliability. The results were as follows:

Measure	Ratio 1		Ratio 2		r
	Mean	S.D.	Mean	S.D.	
MLU	1.95	0.63	1.91	0.16	0.96
DSS	3.22	0.63	3.46	0.95	0.90
TTR	0.41	0.01	0.37	0.01	0.88

It should be noted that the DSS comparison was based on only eight pairs of transcripts. In the other four pairs, there were not sufficient sentences to permit the use of the DSS analysis.



Appendix C: PROCEDURE FOLLOWED IN  
EDITING LANGUAGE SAMPLES



Transcripts of the pre-training and post-training language-sampling interviews were edited so as to remove those utterances which could not be used. These included the following:

- (a) Echolalic utterances. In some instances, the child would give a one or two word response which was simply an echo of what the examiner had just said. These were not used and were crossed out, since they could not with confidence be called spontaneous utterances. If, however, the child modified the utterance in some way then it was retained. For example, if the examiner said "They all fell down" and the child responded with "Down", this would not have been counted. If, on the other hand, the examiner said, "That's an alligator" and the child responded with a clearly interrogative, "An alligator?" that would have been retained.
- (b) Transfer noises. Such expressions as "uh" and "mm" were not included in the corpus, and neither was "well" when it was used in the same manner. Of course, "Well" used adverbially was counted. Interjections such as "oh!" and "yuck" were not counted either.
- (c) Recitations. In a few instances, children recited rhymes or sang bits of songs. These were not counted, since they were not the child's own language and tended to be expressions that were much longer than the child's own characteristic utterances. For example, one child said grace about a dozen times during one interview, each time he set out "food" for a make-believe tea party. If his dozen recitations of "God is great, God is good. Let us thank him for our food" had been included, it



would have made his mean-length-of-utterance score unreasonably high.

- (d) Counting. Similarly, sometimes a child would count as high as he could without apparent reference to anything, or else would point to and count a series of six or eight items. In these instances the utterances were discarded. However, if a child said, "There three" or "Want two" these were counted. In a sequence such as the following, only the final "Two" would be counted:

E. "How many are there?"

S. One, two. Two!

- (e) "Reading". Some of the children could identify written letters and numbers. These might have been counted, on the grounds that naming a "D" is much the same as naming a cat or a horse or anything else. However, it was decided to discard them. If a child read half of the alphabet, this could be counted as a 13-item utterance which, for these children, would have been unusually long. It could instead have been counted as 13 single-word utterances, but this in most instances would have tended to shorten the mean length of utterance unduly. Therefore, it was decided not to count letters and numbers and the occasional words which were read.
- (f) Incomprehensible words. Words that were not comprehensible were not included. Neither were the few neologisms that occurred.



Appendix D: RULES CONCERNING WHAT WORDS  
TO COUNT IN COMPUTING TYPE COUNT AND  
TYPE-TOKEN RATIOS



It was necessary, for the sake of consistency, to establish several simple rules governing which words to count in computing type count and type-token ratios. These rules included the following:

- (a) The various forms of "yes" were all counted as instances of "yes" (yep, yup, yeah, m-hm, okay, etc.)
- (b) Expressions such as "uh-uh", "nope", and "no-way" were all counted as instances of "no".
- (c) Both singular and plural forms were counted as instances of the same vocabulary item, e.g. "dog" and "dogs".
- (d) Inflected verb forms were counted as instances of a single vocabulary entry e.g. "fall", "fell", "falling", or "sleep", and "sleeping". "Sleepy", however, would count as a separate entry.
- (e) Diminutive forms (e.g. "mommy" and "doggie") counted as instances of the more standard forms (e.g. "mother" and "dog").
- (f) Proper nouns, compound words (e.g. ice-cream, hot-dog), and ritualized reduplications (e.g. choo-choo, bye-bye) were counted as single words.



Appendix E: RULES FOLLOWED IN EDITING  
TRANSCRIPTS PRIOR TO COMPUTATION OF  
MEAN LENGTH OF UTTERANCE (MLU)



Eleven rules were established for editing the transcript prior to the computation of Mean Length of Utterance. The first six rules are from Brown (1972, p. 54):

1. Only fully transcribed utterances are used; none with blanks.
2. Include all exact utterance repetitions. Stuttering is counted as repeated efforts at a single word. Count the word once in the most complete form produced. In the few cases where a word is produced for emphasis or the like (no, no, no) count each occurrence.
3. All compound words (two or more free morphemes), proper names, and ritualized reduplications count as single words. Examples: birthday, rickety-boom, choo-choo, quack-quack, night night, pocketbook, seesaw. Justification is that there is no evidence that the constituent morphemes function as such for these children.
4. Count as one morpheme all diminutives (doggie, mommy) because these children at least do not seem to use the suffix productively. Diminutives are the standard form used by the child.
5. Count as one morpheme all irregular pasts of the verb (got, did, went, saw). Justification is that there is no evidence that the child relates these to present forms.
6. Count as separate morphemes all auxiliaries (is, have, will, can, must, would). Also all catenatives: "gonna", "wanna", "hafta". These latter are counted as single morphemes rather than as "going to" or "want to" or "have to" because the evidence is that they function so for the children. Count as separate morphemes all inflections, for example, possessive /s/, third person singular /s/, regular past /d/, progressive



/iŋ/.

To these six rules from Brown were added another five rules:

7. Count yes, no and their variants, when they occur at the beginning of an utterance, as separate utterances.
8. Count tag questions (eh?) as single morphemes and as parts of utterances that they follow.
9. "Lookit" or "Look at", when it occurs alone and not followed by an object, is counted as a single morpheme.
10. Count the th ending on ordinal numbers as separate morphemes (e.g. seven th). Also the r in your, n in broken, and y in sleepy.
11. Negative forms of auxiliary verbs (can't, couldn't, etc.) count as two morphemes each.



Appendix F: INSTRUCTIONS FOR SELECTING A CORPUS OF UTTERANCES  
SUITABLE FOR DEVELOPMENTAL SENTENCE SCORE (DSS) AND DEVELOPMENTAL  
SENTENCE TYPE (DST) ANALYSIS, AND RULES FOR DST AND DSS ANALYSES



# 1. Instructions for Selecting the Corpus

A total of fifteen rules, based on those recommended by Lee (1974), were followed in selecting each corpus of utterances for grammatical analysis:

1. The corpus should contain 100 utterances for analysis by DST.

Lee points out that if a language-sampling interview of an hour's duration does not yield one hundred different utterances, then the DST is not an appropriate procedure for use with the child.

2. The corpus should contain fifty "complete" sentences for analysis by DSS. If a child can produce fifty complete sentences during the language-sampling interview, then the presentences are not included in the corpus.

3. The language sample should be a block of consecutive utterances. Where there are many more than the required number of sentences available in the transcript, Lee recommends scanning the transcript and picking out what might be the "best" fifty consecutive utterances.

4. All utterances in the language sample must be different. No repetitions of sentences are included. Thus a child who frequently says "I don't know" or "What's that?" does not build up a high score on the basis of a few stereotyped sentences.

5. Unintelligible utterances should be excluded from the corpus. Sentences with an unintelligible or unknown name-word may be counted (e.g. "I got a owie") but if the unintelligible word involves a potentially scoring part of the utterance, such as a verb tense, then the whole utterance should be discarded. Thus, "My teacher's name is \_\_\_\_." would be used, and so



would "He has a \_\_\_\_\_ and a bike", but "He \_\_\_\_\_ a scooter and a bike" would be discarded.

6. Echoed utterances should be excluded from the corpus if it echoes the examiner's utterance exactly. If it has been altered or reformulated by the child, however, it is included in the corpus. For example:

Examiner: "Where is he going?"

Subject: "Where he going?"

The subject's utterance would be included in the corpus.

7. Interjections such as "yes", "no", "OK", "oh", "oh-oh", "hi", "bye-bye" and "hey" should be counted as separate one-word utterances. Beyond these, Lee recommends the general rule that any interjection which has an accepted spelling is also entitled to be included in the transcription and treated as a one-word utterance e.g. "sh", "oops", "wow", etc.

8. Nouns in direct address should be separated and considered as independent entries in the language corpus.

e.g. Baby, go sleep = Baby + Go sleep.

9. Question markers such as the tag "eh?" or "right?" are to be counted separately and not as part of the utterance with which they occur.

e.g. Over here, okay? = Over here + Okay?

The same is true for sentence tags such as "I think" and "You know".

10. Imperative interjections such as "look", "lookit", and "see" should be separated from the rest of the utterance and counted separately.



e.g. See, here a doggie = See + Here a doggie.

Lee also gives five rules for separating complete sentences within the transcript. Although the sentences produced by subjects in the present study seldom achieved a level of complexity necessitating the use of these rules, they are stated in summary form below:

11. Sentences which begin with conjunctions are counted as complete sentences. e.g. (Because) I wanted it.

(But) I saw them.

12. Only one "and" conjunction per sentence is allowed when the "and" connects two independent clauses.

e.g. I came home and my dad was there . . . (and) he saw my dog.

13. The conjunction "and" used in a series, a compound subject, or a compound predicate does not require the sentence to be broken up.

14. Internal conjunctions other than "and" do not require a sentence to be broken up.

15. At the clinician's (examiner's) discretion, the rules for "and" may be applied to any other overused conjunction (e.g. "so").

## 2. Rules for DST Analysis

DST analysis calls for both horizontal and vertical classification. In the horizontal classification, presentence utterances are divided into (1) single words, (2) two-word combinations, and (3) multiword constructions which are not complete sentences. Complete sentences would be analysed by DSS and therefore are not included in the DST analysis. In the vertical classification, the presentence utterances are categorized according to the different types of sentences with



different semantic contents, information, or messages that are emerging. Thus each utterance is classified under one of five headings: (1) noun, (2) designator, (3) descriptive item, (4) verb, and (5) vocabulary item. The "designative sentence" merely names, points out, or identifies a subject of conversation without telling anything further about it. The third ("descriptive item") column develops into the "predicative sentence", which names the topic and then proceeds to "predicate" something about it. Lee points out that both designative and predicative sentences use the copula in the verb slot but the predicative sentence, unlike the designative sentence, includes both topic and comment. At the one-word level, designators are words which simply identify or locate the topic. Descriptive items, on the other hand, are adjectives. The fourth vertical column on the DST chart represents the development of the subject-verb sentence in which the verb is a lexical word, not a copula. In the fifth column, "vocabulary items", are placed utterances which contain neither the subject nor the verb of a sentence.

Under each heading in the vertical classification there is an elaboration in the horizontal classification. Thus in the "noun" column there is a progression from the single-word noun to the two-word noun phrase to more elaborate noun phrases of three or more words. In the "designator" column there is development from the single-word designator (e.g. "there") to designative elaborations of increasing length. A similar progression is possible in the "verb" column. In the "vocabulary item" column, single-word entries include various interjections, adverbs such as "again", "now" and "too", and tag questions. At the two-word and multiword levels, various fragments would be included.



Lee's (1974) chart showing the Developmental Sentence Types (DST) Classification of Presentences is reproduced below. A sample DST analysis sheet together with the corpus of utterances on which it is based appears below.



Chart 1. The Developmental Sentence Types (DST) Classification of Pre-sentences

	NOUN	DESIGNATOR
SINGLE WORDS	<p>car    Daddy    kitty-cat truck   Mommy   Santa Claus cookie girl   hot-dog</p> <p>Basic sentence elaborations: Plural: <i>books, cars, men</i></p> <p>Basic sentence modifications: Pronoun: <i>me, something, nobody</i> Question: <i>book? car? truck (right?)</i></p>	<p><i>here, there</i> <i>this, that</i> <i>it</i></p> <p>Basic sentence elaborations: Plural: <i>those, these</i></p> <p>Basic sentence modifications: Question: <i>this? that? here? there?</i></p>
	NOUN ELABORATION	DESIGNATIVE ELABORATION
2-WORD COMBINATIONS	<p>Noun phrase Article: <i>a car, the truck</i> Possessive: <i>Daddy car, Billy truck</i> Quantifier: <i>more car, other truck, two boy</i> Adjective: <i>big car, dirty truck, red shoe</i> Attributive: <i>baby bear, police car</i></p> <p>Basic sentence elaborations: Plural: <i>the cars, more trucks</i> Additive: <i>car truck, Mommy Daddy</i> Adverb: <i>now car, truck too, car again</i> Subject-object: <i>doggie bone, Daddy ball</i> Subject-locative: <i>car garage, Mommy window</i></p> <p>Basic sentence modifications: Pronoun: <i>this one, my truck, her cookie</i> Negative: <i>not car, not truck, not this</i> Question: <i>a car? another truck (OK?)</i> Wh-question: <i>what car? which one?</i> Conjunction: <i>and car, and truck, and this</i></p>	<p>Designator + noun <i>here car, there truck, this car, that truck, it car, it truck</i></p> <p>Basic sentence elaborations: Plural: <i>these cars, there trucks</i> Adverb: (<i>that again = noun + adverb</i>) (<i>there now, here again = fragments</i>)</p> <p>Basic sentence modifications: Pronoun: <i>here something, there one</i> Negative: (<i>not this = noun + negative</i>) (<i>not here, not there = fragments</i>) Question: <i>that truck? this car (right?)</i> Wh-question: <i>what this? who that?</i> Conjunction: (<i>and this = noun + conj.</i>) (<i>and here, and there = fragments</i>)</p>
CONSTRUCTIONS	<p>Noun phrase <i>my big car, some more truck, a red box</i> Noun phrase + prepositional phrase <i>the car in front, the spot on the floor</i> Quantifier + prepositional phrase <i>all of them, some of the other cars</i></p> <p>Basic sentence elaborations: Plural: <i>some other cars</i> Adverb: <i>now the car, the other truck too</i> Additive: <i>the car the truck</i> Subject-object: <i>the doggie another bone</i> Subject-locative: <i>the car the garage</i></p> <p>Basic sentence modifications: Pronoun: <i>his other truck, all of mine</i> Negative: <i>not the car, not that one</i> Question: <i>the other car? the boy too (huh?)</i> Wh-question: <i>what big car? which other one? how much milk? how many cookies? how about that one? what about me?</i> Conjunction: <i>and the car, car and truck</i></p>	<p>Designator + noun phrase <i>here another car, there a truck</i> <i>this a red car, that my truck</i> <i>it a big car, it my truck</i></p> <p>Basic sentence elaborations: Plural: <i>here some cars, these big cars</i> Adverb: <i>there car too, here car now</i> Additive: <i>there Mommy Daddy</i></p> <p>Basic sentence modifications: Pronoun: <i>that somebody car, here his car</i> Negative: <i>that not car, this not a truck</i> Question: <i>that a car? this a car (right?)</i> Wh-question: <i>who that boy? what that one?</i> Conjunction: <i>here a car and truck</i></p>



Chart 1. The Developmental Sentence Types (DST) Classification of Pre-sentences (continued)

DESCRIPTIVE ITEM	VERB	VOCABULARY ITEM
<p><i>big, pretty, broken, fixed</i> <i>one, two, more</i> <i>on, off, up</i></p> <p>Basic sentence elaborations: None</p> <p>Basic sentence modifications: Pronoun: <i>my, his</i> Question: <i>red? big (huh?)</i></p>	<p><i>sleep, eat, walk, fall</i> (<i>look, lookit, wait, stop</i> = imperative sentence)</p> <p>Basic sentence elaborations: Verb elaboration: <i>going, fell</i></p> <p>Basic sentence modifications: Negative: <i>can't, won't</i> (<i>don't</i> = imperative sentence) Question: <i>see? eat (OK?)</i></p>	<p><i>yes, no, OK, oh, hey, hi</i> <i>bye-bye, night-night, oh-oh</i></p> <p>Basic sentence elaborations: Adverb: <i>again, now, too</i></p> <p>Basic sentence modifications: Question: <i>huh? right? OK?</i> Wh-question: <i>what? who? where? when? how? why?</i> Conjunction: <i>because</i></p>
PREDICATIVE ELABORATION	VERBAL ELABORATION	FRAGMENTS
<p>Noun + descriptive item <i>car broken, truck dirty</i> <i>light off, TV on</i> <i>car there, truck here</i></p> <p>Basic sentence elaborations: Plural: <i>cars here, lights on</i></p> <p>Basic sentence modifications: Pronoun: <i>that pretty, it big</i> <i>something here, another on</i> Question: <i>car broken?</i> <i>it gone (right?)</i> Wh-question: <i>where car?</i> <i>what here? who there?</i></p>	<p>Verb + object: <i>hit ball</i> Verb + locative: <i>sit chair</i> Verb + particle: <i>fall down</i> (Noun + verb = sentence: <i>baby sleep, that go, it fall</i>)</p> <p>Basic sentence elaborations: Verb elaboration: <i>saw car</i> Plural: <i>eat cookies, see cars</i> Adverb: <i>eat now, fall too</i></p> <p>Basic sentence modifications: Pronoun: <i>see it, find one</i> Negative: <i>not fall, can't go</i> Question: <i>see it? go home?</i> Wh-question: <i>where go?</i> <i>what take? what find?</i> (<i>who go? what come? = sentence</i>) Conjunction: <i>and sleeping</i> Infinitive: <i>wanna go, gonna go</i></p>	<p>Basic sentence elaborations: Prepositional phrase: <i>for Daddy, in car</i> Plural: <i>on chairs, in cars</i> Adverb: <i>too big, all gone, up now, here again, right here, over there</i></p> <p>Basic sentence modifications: Pronoun: <i>to you, in it</i> Negative: <i>not big, not here</i> Question: <i>in here?</i> <i>all gone (huh?)</i> Conjunction: <i>and big, but dirty, and here</i></p>
<p>Noun phrase + descriptive item: <i>the car broken, a truck dirty, this light off, the TV on, other car there, a truck here, car in garage, hat on head, Spot a good dog, Tom bad boy</i></p> <p>Basic sentence elaborations: Plural: <i>all cars broken</i> Adverb: <i>light off now, car here too, truck too dirty</i> Double locator: <i>car over there</i></p> <p>Basic sentence modifications: Pronoun: <i>he bad boy, it off now</i> Negative: <i>this not broken</i> Question: <i>it off now? car over there (huh?)</i> Wh-question: <i>where that one? who in car? what color car? what in here?</i> Conjunction: <i>car and truck here</i></p>	<p>Verb + object: <i>eat the cookie</i> Verb + locative: <i>put the table</i> Verb + particle + noun: <i>take off hat, turn on light</i> (Noun phrase + verb = sentence <i>the car go, a boy eat</i>)</p> <p>Basic sentence elaborations: Verb elaboration: <i>goes in barn</i> Adverb: <i>see car now, go in too</i></p> <p>Basic sentence modifications: Pronoun: <i>want it now</i> Negative: <i>not fall down</i> Question: <i>see that one? eat more cookies (OK?)</i> Wh-question: <i>where put car? what take out? what find here? what doing to car?</i> Conjunction: <i>and find car</i> Infinitive: <i>wanna see it, gonna go home, gotta find it</i></p>	<p>Words in series: <i>1, 2, 3, 4, etc.</i> <i>dog, cow, pig, etc.</i></p> <p>Basic sentence elaborations: Prepositional phrase: <i>in the car, for the boy</i> Plural: <i>on the chairs</i> Adverb: <i>in car too, back over there</i></p> <p>Basic sentence modifications: Pronoun: <i>on my head</i> Negative: <i>not in it</i> Question: <i>in here too? in the car (right?)</i> Conjunction: <i>and for me</i></p>

SINGLE WORDS

2-WORD COMBINATIONS

CONSTRUCTIONS



### 3. Rules for Developmental Sentence Scoring (DSS)

If the corpus contains 50 "complete" sentences, then DSS analysis may be used. The fifty sentences are written on the DSS record form and scores are entered in eight columns corresponding to the eight categories of grammatical structure under consideration. Credit is given only when a structure meets all the requirements of adult standard English. Lee also allows for "attempt" marks (a line) in place of the numerical score, to show that a child was attempting a structure which he has not yet mastered. The child receives numerical scores for each grammatical element correctly employed. He may receive an additional "sentence point" if a sentence meets all adult standard rules. The following chart from Lee (1974, p. 134) summarizes the scoring system for DSS analysis.



Chart 8. The Developmental Sentence Scoring (DSS) Reweighted Scores

INDEFINITE PRONOUNS OR HOST MODIFIERS	PERSONAL PRONOUNS	MAIN VERBS	SECONDARY VERBS
it, this, that	1st and 2nd person: I, me, my, mine, you, your(s)	A. 1st flexed verb: I see you. B. Copula, is or's: It's red. C. Is + verb + ing: He <del>is</del> coming.	
	3rd person: he, him, his, she, her, hers	A. -s, and -ed. plays, played B. Irregular past: ate, was C. Copula: am, are, was, were D. Auxiliary am, are, was, were	Five early-developing infinitives: I wanna see (want to see) I'm gonna see (going to see) I gotta see (got to see) let me /to/ see (let me /to/ see) let's /to/ play (let /to/ play) Non-complementing infinitives: I stopped to play. I'm afraid to look. It's hard to do that.
A. no, some, more, all, lot(s), one(s), two (etc.), other(s), another B. something, some- body, someone nothing, nobody, none no one	A. Plurals: we, us, our(s), they, them, their B. these, those  Reflexives: myself, your- self, himself, herself, itself, themselves	A. can, will, may + verb: may go B. Obligatory do + verb: don't go C. Emphatic do + verb: I do see.	Participle, present or past: I see a boy running. I found the toy broken.
			A. Early infinitival comple- ments with differing subjects in kernels: I want you to come. Let him /to/ see. B. Later infinitival complements: I had to go. I told him to go. I tried to go. He ought to go. C. Obligatory deletions: Make it /to/ go. I'd better /to/ go. D. Infinitive with wh-word: I know what to get. I know how to do it.
	A. Wh-pronouns: who, which, whose, whom, what, that, how many, how much I know who came. That's what I said. B. Wh-word + infinitive: I know what to do. I know who(m) to take	A. could, would, should, might + verb: might eat, could be B. Obligatory does, did + verb C. Emphatic does, did + verb	
A. any, anything, any- body, anyone B. every, everything, everybody, everyone C. both, few, many, each, several, most, least, much, next, first, last, second (etc.)	(his) own, one, oneself, whichever, whoever, whatever Take whatever you like.	A. Passive with get, any tense Passive with be, any tense B. must, shall + verb: must come C. have + verb + en: I've eaten D. have got: I've got it.	Passive infinitival complement: With get: I have to get dressed. I don't want to get hurt. With be: I want to be pulled. It's going to be locked.
		A. have been + verb + ing had been + verb + ing B. modal + have + verb + en: may have eaten C. modal + be + verb + ing could be playing D. Other auxiliary combinations: should have been sleeping	Gerund: Swimming is fun. I like fishing. He started laughing.



Chart 8. The Developmental Sentence Scoring (DSS) Reweighted Scores (continued)

INTERROGATIVE  
SENTENCES

WH-QUESTIONS

NEGATIVES

CONJUNCTIONS

It, this, that + copula or  
auxiliary is, 's, + not:  
It's *not* mine.  
This is *not* a dog.  
That is *not* moving.

Reversals of copula:  
Isn't it red? *Was* they  
there?

- A. who, what, what + noun:  
*Who* am I? *What* is he  
eating? *What* book are  
you reading?
- B. where, how many, how  
much, what...do,  
what...for:  
*Where* did it go?  
*How* much do you want?  
*What* is he doing?  
*What* is a hammer for?

and

can't, don't

Reversal of auxiliary be:  
*Is* he coming? *Isn't*  
coming? *Was* he going?  
*Wasn't* he going?

isn't, won't

- A. but  
B. so, and so, so that  
C. or, if

when, how, how + adjective  
*When* shall I come?  
*How* do you do it?  
*How* big is it?

because

- A. Obligatory do, does,  
did: *Do* they run?  
*It* bite? *Didn't* it hurt?
- B. Reversal of modal:  
*Can* you play? *Won't* it  
hurt? *Shall* I sit down?
- C. Tag question:  
*It's* fun, *isn't* it?  
*It isn't* fun, *is* it?

why, what if, how come  
how about + gerund  
*Why* are you crying?  
*What if* I won't do it?  
*How come* he is crying?  
*How about* coming with me?

All other negatives:

- A. Uncontracted negatives:  
I can *not* go.  
He has *not* gone.
- B. Pronoun-auxiliary or  
pronoun-copula  
contraction:  
I'm *not* coming.  
He's *not* here.
- C. Auxiliary-negative or  
copula-negative  
contraction:  
He *wasn't* going.  
He *hasn't* been seen.  
It *couldn't* be mine.  
They *aren't* big.

- A. where, when, how,  
while, whether (or not),  
till, until, unless, since,  
before, after, for, as, as  
+ adjective + as, as if,  
like, that, than  
I know *where* you are.  
*Isn't* come *till* I call.
- B. Obligatory deletions:  
I run faster *than* you  
(run).  
I'm as big as a man (is  
big).  
It looks like a dog  
(looks).
- C. Elliptical deletions  
(score 0):  
That's *why* (I took it).  
I know *how* (I can do  
it).
- D. Wh-words + infinitive:  
I know *how* to do it.  
I know *where* to go.

- A. Reversal of auxiliary  
have:  
*Has* he seen you?
- B. Reversal with two or  
three auxiliaries:  
*Has* he been eating?  
*Couldn't* he have  
waited?  
*Could* he have been  
crying?  
*Wouldn't* he have been  
going?

whose, which which + noun  
*Whose* car is that?  
*Which* book do you want?



Appendix G: SCHEDULE OF ASSIGNMENT OF  
LANGUAGE TRAINERS TO TREATMENT GROUPS



Groups:	A	B	C		A	B	C
April 21	Linda	Penny	Carol	May 26	Penny	Carol	Linda
April 22	Linda	Carol	Penny	May 27	Carol	Linda	Penny
April 23	Penny	Linda	Carol	May 28	Carol	Linda	Penny
April 24	Penny	Linda	Carol	May 29	Penny	Carol	Linda
April 25	Carol	Linda	Penny	May 30	Penny	Linda	Carol
April 28	Linda	Carol	Penny	June 2	Carol	Penny	Linda
April 29	Penny	Linda	Carol	June 3	Linda	Penny	Carol
April 30	Penny	Linda	Carol	June 4	Carol	Penny	Linda
May 1	Penny	Linda	Carol	June 5	Carol	Penny	Linda
May 2	Linda	Carol	Penny	June 6	Carol	Linda	Penny
May 5	Penny	Carol	Linda	June 9	Penny	Carol	Linda
May 6	Penny	Linda	Carol	June 10	Linda	Penny	Carol
May 7	Linda	Penny	Carol	June 11	Penny	Carol	Linda
May 8	Linda	Penny	Carol	June 12	Carol	Linda	Penny
May 9	Carol	Linda	Penny	June 13	Carol	Penny	Linda
May 12	Linda	Carol	Penny	June 16	Carol	Penny	Linda
May 13	Carol	Penny	Linda	June 17	Penny	Carol	Linda
May 14	Carol	Penny	Linda	June 18	Penny	Carol	Linda
May 15	Linda	Carol	Penny	June 19	Linda	Penny	Carol
May 16	Carol	Linda	Penny	June 20	Linda	Carol	Penny
May 20	Linda	Penny	Carol				
May 21	Linda	Carol	Penny				
May 22	Penny	Carol	Linda				
May 23	Carol	Penny	Linda				



**Appendix H: SEQUENCE OF ACTIVITIES  
FOR LANGUAGE TRAINING SESSIONS**



A brief outline of the sequence of activities for language training is as follows:

Day 1: Sandtable and plastic toys

Day 2: Farm theme - making a cardboard barn

Day 3: Farm theme - flannelboard with felt figures of farm animals.

Day 4: Farm theme - picture books and large picture cards depicting  
farm animals

Day 5: Review of concepts and materials of prior lessons

Day 6: Making play dough

Day 7: Self-awareness theme - making happy faces and sad faces with  
play dough and construction paper

Day 8: Self-awareness theme - dress-up clothes, dramatic play

Day 9: Self-awareness theme - making paper-bag masks

Day 10: Review of concepts and materials of prior lessons

Day 11: Communication theme - two plastic toy telephones

Day 12: Communication theme - making tin-can telephones

Day 13: Weather theme - using an umbrella

Day 14: Weather theme - making a collage about rainy weather, sunshine,  
etc.

Day 15: Review of concepts and materials of prior lessons

Day 16: Food theme - making a cardboard kitchen stove

Day 17: Food theme - having a make-believe tea party

Day 18: Food theme - decorating cupcakes with icing

Day 19: Food theme - starting a saucer-garden (bean seeds)

Day 20: Review of concepts and materials of prior lessons

Day 21: Transportation theme - plastic boats, trucks and cars

Day 22: Transportation theme - making a collage with magazine pictures



of cars, trucks, airplanes, etc.

- Day 23: Transportation theme - making and flying paper airplanes
- Day 24: Review of concepts and materials of prior lessons
- Day 25: Food theme - grocery jars, tins, and boxes (a make-believe store)
- Day 26: Self-awareness theme - making stand-up "puppet" figures
- Day 27: Household theme - using brooms and dustpans
- Day 28: Household theme - making a collage using magazine pictures of appliances, furniture, brooms, etc.
- Day 29: Review of concepts and materials of prior lessons
- Day 30: Making play dough
- Day 31: Making a large cardboard castle
- Day 32: Making hand puppets
- Day 33: Review of concepts and materials of prior lessons
- Day 34: Decorating cupcakes
- Day 35: Pet theme - picture books of animal pets, with picture stamps to cut out and paste
- Day 36: Dress-up day
- Day 37: Review of concepts and materials of prior lessons
- Day 38: Pet theme - getting to know real puppies and kittens
- Day 39: A cookie and juice tea party
- Day 40: A review day - trainers helped the children to recall many of the things that they had done
- Day 41: Baby animals - real chickens and ducks
- Day 42: Listening to familiar sounds - tape recorded household noises
- Day 43: Review of concepts and materials of prior lessons
- Day 44: A last day party - cookies and juice





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